DOCUMENT RESUME

ED 366 469 PS 022 189

AUTHOR	Seppanen, Patricia S.; And Others
TITLE	Observational Study of Early Childhood Programs. Final Report. Volume II: Chapter 1-Funded Early Childhood Programs.
INSTITUTION	Abt Associates, Inc., Cambridge, Mass.; Development Assistance Corp., Dover, NH.; RMC Research Corp., Portsmouth, NH.
SPONS AGENCY	Department of Education, Washington, DC. Office of the Under Secretary.
PUB DATE	93
CONTRACT	EALC890980
NOTE	222p.; For Volume I, see PS 022 188.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC09 Plus Postage.
DESCRIPTORS	*Child Development; *Cognitive Development; Day Care Effects; Disadvantaged Youth; Early Childhood Education; Emotional Development; Federal Aid; Financial Support; High Risk Students; *Preschool Children; *Preschool Education; *Preschool Evaluation; *Program Effectiveness; Social Development
IDENTIFIERS	*Education Consolidation Improvement Act Chapter 1

ABSTRACT

The Observational Study of Early Childhood Programs, which examined 119 preschool programs in 5 states, was designed to describe the classroom experiences of economically or educationally disadvantaged 4-year-olds and to examine linkages between characteristics of early childhood programs and activities of children and teachers in the classroom. This report describes a substudy of approximately 750 children in 55 prekindergarten classrooms funded all or in part with money from Chapter 1 of the Hawkins-Stafford Elementary and Secondary School Improvement Amendments of 1988. The substudy described was designed to examine relationships between Chapter 1-funded prekindergarten classrooms and children's cognitive and social-emotional development, and to describe how the programmatic experiences of children changed from prekindergarten to kindergarten. The substudy found that Chapter 1-funded programs did not contain a larger number of high-risk students than the programs in the larger study, and that they were comparable in quality to the programs in the larger study. Although global ratings of classroom quality demonstrated that most of the sample classrooms were adequate, they did little to predict child outcomes in these classrooms. Three appendixes provide information about the use of Chapter 1 funds in prekindergarten, a rationale for changing the substudy design, and discussion of issues related to the Bronson Social and Task Skills Profile. Includes 139 references. (MDM)

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OBSERVATIONAL STUDY OF EARLY CHILDHOOD PROGRAMS

VOLUME II

CHAPTER 1 FUNDED EARLY CHILDHOOD PROGRAMS

Prepared Under Contract by:
Development Assistance Corporation

Subcontractors:
RMC Research Corporation
Abt Associates, Inc.

Contract No. EALC890980

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OBSERVATIONAL STUDY OF EARLY CHILDHOOD PROGRAMS

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FINAL REPORT VOLUME II:

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The conduct of this study and the preparation of this report were sponsored by the U.S. Department of Education, Office of the Under Secretary under Contract No. EALC890980 (Elois Scott and Elizabeth Farquhar, Project Officers). Opinions, findings, conclusions, or recommendations expressed do not necessarily reflect the views of the U.S. Department of Education. Nor do the examples included herein imply judgment by the Department or the contractor as to their compliance with federal or other requirements.

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EXECUTIVE SUMMARY

The *Observational Study of Early Childhood Programs* (the Observational Study) was commissioned in 1989 by the U.S. Department of Education to expand our knowledge and understanding of the early childhood experience of four-year-old children from economically disadvantaged families. It emphasized detailed observations of the early childhood environment as a way to provide unique insights into that experience.

The Observational Study consists of two related studies: a descriptive study of 119 early childhood classroom environments (including Head Start programs, school-sponsored programs, and community-based day-care centers) in five geographically-distributed sites and a substudy of children in 55 prekindergarten classrooms funded all or in part with money from Chapter 1 of the Hawkins-Stafford Elementary and Secondary School Improvement Amendments of 1988. It is the second of these studies that is the focus of this volume.

General Approach to the Chapter 1 Substudy

Purpose

The special substudy of Chapter 1 early childhood programs was designed to examine relationships between Chapter 1-funded prekindergarten classrooms and children's cognitive and social-emotional development and to describe how the programmatic experiences of children changed from prekindergarten to kindergarten. The substudy targeted three major objectives:

- to investigate variation across Chapter 1-funded programs in structural and environmental characteristics, interactions between caregivers and children, and the nature of children's activities;
- to relate Chapter 1-funded prekindergarten classroom characteristics and processes to child outcomes; and
- to examine how the programmatic experiences of children enrolled in Chapter 1-funded prekindergarten classrooms changed from prekindergarten to kindergarten.

Method

The substudy design included individual assessments of the cognitive and social-emotional development of children enrolled in Chapter 1-funded classrooms during the fall and spring (1990-1991) of their prekindergarten year. Classroom observations and interviews of school principals and teachers in spring 1991 provided data on classroom characteristics and processes. A subset of sample children was followed into kindergarten (1991-1992) and in spring 1992 their kindergarten classes were observed and their cognitive and social-emotional development again assessed.

The sample. The Chapter 1 substudy included several distinct samples representing five sites and 16 school districts, 55 prekindergarten classrooms funded all or in part with Chapter 1 funds, and approximately 750 children enrolled in these classrooms. A randomly selected subset of 131 sample children was followed into 48 kindergarten classrooms located in four sites. While we did not sample Chapter 1-funded prekindergarten classrooms randomly from the national population of such classrooms, we believe that the sample represents the range of quality in these programs with certain limitations: for the purposes of data collection and analysis, site selection was confined to urban and suburban settings. However, in order to address adequately the Chapter 1 substudy's primary objectives, we selected sites and school districts to maximize variation in terms of population served, location, and state regulatory requirements. As will be seen, the Chapter 1-funded classrooms in the substudy sample represented a restricted range of quality on many of the classroom variables of interest.

The measures. The complexity of the investigation of the influence of Chapter 1 prekindergarten environments on children's cognitive and social-emotional development required the collection of classroom-level and child-level data that varied by data collection episode. The classroom-level measures consisted of four observational rating scales of overall classroom quality (the Description of Preschool Practices, the Assessment Profile for Early Childhood programs, the Early Childhood Environment Rating Scale, and the Arnett Global Rating Scale of Caregiver Behavior), and three observational systems (the Preschool Classroom Snapshot, the Abt Associates [AAI] Child-Focused Observation, and the AAI Adult-Focused Observation) for recording ratio and group size, types of classroom activities and grouping arrangements, teaching staff behaviors and interactions, and child behaviors and interactions. A teacher interview covered topics related to teacher background and experience, training and staff development, teaching approach, parent involvement, and curriculum planning. The principal interview included questions regarding general background characteristics of the school and program, enrollment policies, staff, curriculum, and activities. For the kindergarten year, both the teacher and principal interviews were revised to include questions regarding activities meant to smooth children's transition from prekindergarten to kindergarten.

We assessed children's cognitive and social-emotional development in several ways. During the fall and spring of the prekindergarten year, we used the Preschool Inventory (PSI) to assess the cognitive ability of children; the Peabody Picture Vocabulary Test was used in place of the PSI in kindergarten. In the spring of the prekindergarten year, we added behavioral observations in the classroom environment using the Bronson Social and Tasks Skills Profile to record the social and mastery task competence of individual children. We obtained teacher ratings of child performance using the Child Behavior Rating Scale during the fall and spring of the prekindergarten year and again in the spring of the kindergarten year.

Major Findings and Implications

Characteristics of Enrolled Children

Chapter 1-funded prekindergarten programs enrolled a diverse group of four-year-olds. We saw variation among school districts and sites in terms of the background characteristics of children and their families, although on average, these programs did not enroll concentrations of children who could be characterized as being at high risk for school failure due to environmental factors. Comparing the background characteristics of children enrolled in Chapter 1-funded prekindergarten classrooms to the main study sample classrooms (i.e., Head Start, community-based programs, and school-based programs) we saw that overall, children were not distinguishable in terms of the estimated incidence of a number of potential risk factors: having a father absent from home, the presence in the classroom of children whose first language was not English, the presence of diagnosed and undiagnosed developmental delays or problems, having a substance-abusing parent, being from a migrant or recent immigrant family, being from a homeless family, or the presence of children living apart from their birth mother. This lack of variation overall, however, may mask local differences by site or community. The key policy issue for states and local communities faced with a mix of early childhood programs and funding sources remains: how to use categorical funding sources to best advantage in order to meet the needs of all young children and their families in a way that does not segregate them by categorical funding stream, particularly when we see differences in program quality by type of sponsoring organization.

Overall Quality of Chapter 1-Funded Prekindergarten Classrooms

The overall level of classroom quality was assessed in terms of developmental appropriateness (according to guidelines of the National Association for the Education of Young Children); standards of safety and health; scheduling, curriculum, interaction, and individualization; and the emotional tone of the teacher. In general, the Chapter 1-funded classrooms were of acceptable to good quality. There were very few Chapter 1-funded prekindergarten classrooms that could be characterized as poor quality; where they existed, they were scattered across sites and school districts. More importantly, a number of commonly expressed concerns about school-based prekindergarten programs did not materialize. We found that:

- staff were highly educated and had backgrounds in early childhood; and
- there was strong evidence of parent involvement.

While Chapter 1-funded classrooms tended to have higher average quality ratings than did community-based child-care centers sampled as part of the main study, they were much less likely than were community-based centers to operate full-day programs. The decision to offer full-day or half-day programming is a local decision, influenced heavily by the availability of resources and the mission of the sponsoring organization. Such configurations of higher- versus lower-quality and half- versus full-day sessions illustrates the fragmentation of early childhood education in our communities. Such configurations of available services may place low-income parents in the position of having to sacrifice quality of programming in favor of full-day services in order to enter the job market or an employment training program.

Classroom Characteristics and Dynamics

A number of classroom characteristics and dynamics of the Chapter 1-funded prekindergarten classrooms parallel findings reported in Volume I. These findings suggest areas where programs need to concentrate their improvement efforts in order to maximize resources for serving children most in need. Specifically,

Activities and grouping arrangements. The typical day in a Chapter 1-funded classroom contained many types of activities. About one-quarter of the time was taken up with daily routine activities such as arrival and set-up, preparation for departing, lunch and snacks, and transitions between activities. Another one-third of the time was spent in goal-directed activities (including math/language-related; science/natural world; sewing, woodworking, and cooking; block construction; table games and puzzles; and looking at books) and exploration activities such as sand/water play and dramatic/fantasy play. The majority of time these activities took place in small groups of two to four children, with the remainder of the time divided about evenly between whole class and individual activity. However, some activities that we would expect as part of the core curriculum did not occur on a daily basis in approximately one out of seven classrooms: math/language-related, science and the natural world, and block construction; sand/water play did not occur in closer to one out of two classrooms. Similarly, the use of large group arrangements (seven or more children per group) for goal-directed activities more than one-quarter of the time did not promote the "rich play" among peers that is typically associated with these activities.

Interactions. Classroom staff, including teachers and assistant teachers/aides, actively interacted with children more than half of the time. Looking more closely at this interaction, we saw that the largest proportion of this time was spent with the group as a whole rather than in interactions with small groups of children or individual children. Looking at interaction from the point of view of children, we saw that they spent over half of their time not interacting with peers or adults—either spending time alone or in a teacher-led group. These patterns of interaction also suggest that classrooms were not organized to offer children many opportunities for nonteacher led social interaction among peers.

Relating Classroom Characteristics and Processes to Outcomes for Children

Our analysis of the relationships between classroom environments and children's cognitive and social-emotional development was limited by the relative lack of variation among Chapter 1-funded classroom environments on many of the variables of interest. The global ratings of classroom quality, in particular, demonstrated that most of the sample classrooms were at least adequate—but did little to predict child outcomes in these classrooms beyond child engagement in tasks and their distractibility.

The correlational analyses, considering the relationship of selected classroom dynamics to child outcomes, represent a step toward a more refined view of quality. At first glance, however, we saw that the effects of classroom activities, grouping arrangements, and teacher interactions were confounded. For example, the effect of average child/staff ratios could not be looked at without considering grouping arrangements and interactions associated with classrooms with more or fewer children per adult. The complexity of our analysis task was further magnified by our conception of child outcomes in terms of teachers' perceptions of child competence and a more dynamic assessment of classroom interactions and learning strategies. The Bronson Social and Task Skills Profile, as a classroom-based observation measure of individual children, allowed us to look beyond more static measures of cognitive achievement to information processing models (emphasizing goal-orientation and organizational skills for the development of competence) that some researchers have found to be related to later school success (e.g., Bronson, Pierson, & Tivnan, 1984; Brown & DeLoache, 1978; Bruner, 1986; Casey, Bronson, Tivnan, Riley, & Spenciner, 1991; Kreitler & Kreitler, 1987a, 1987b).

In terms of teacher interaction, short-term cognitive gains were associated with the time that teachers focused on cognitive concepts; the time that teachers spent in teaching and management (and specifically teaching) was positively related to the proportion of time children spent in tasks with goals and tasks completed successfully. At the same time, children were less likely to engage in social interaction with their peers and more likely to be distracted in classrooms in which teachers spent more time teaching and focused on cognitive concepts. The peer social interactions that did occur in these classrooms, however, were at a higher developmental level. Running through these findings was a pervasive positive relationship between teacher warmth and responsiveness, the use of positive interaction techniques (e.g., explaining, questioning, praising, and singing), and the short-term cognitive achievement and the task-related behaviors of children. We also saw indications that within the narrow range of child/adult ratios represented in these classrooms, lower ratios translated into more direct supervision by teachers and fewer opportunities for independent actions by children.

The picture that emerges is a complex one in terms of the effect of teacher interaction. Clearly there was a role for teacher guidance and support of children in their activities. The challenge for teachers may involve being able to gauge this guidance and support so as not to inhibit the independent task organizing and planning strategies of children or their organizing strategies with peers.

While the concept of goal-directed activities (involving a composite of activities thought to produce "rich play") was appealing, it was the time spent in math/language-related activities (broadly defined to include, for example, a counting song) that contributed to children spending more time in tasks with goals, their short-term cognitive achievement, and their performance as measured by teacher ratings. These findings, however, only tell half the story since so little time in these classrooms was spent in dramatic and fantasy play, block construction, as well as other exploratory activities such as sand and water play. We were unable to test the hypothesis that radically different proportions of time spent in these classroom activities would be associated with either mastery or social outcomes for children.

Transitions from Prekindergarten to Kindergarten

Looking longitudinally from prekindergarten to kindergarten, we saw that as a group, three-quarters or more of the Chapter 1-funded prekindergarten classrooms and teachers were rated above the midscale of a global quality measure, but more than 60 percent of the kindergarten classrooms and teachers were rated so favorably. From the point of view of individual sample children, we saw that most of their transition experiences involved moving from higher quality prekindergarten classrooms to kindergarten classrooms that ranged in quality. In terms of average observed child/staff ratios, children moved from prekindergartens that averaged fewer than 10 children per adult to kindergarten classrooms of much lower quality in terms of ratio, averaging approximately 17 children per adult (NAEYC guidelines recommend ratios of 8:1 to 10:1 for five-year-olds, depending upon group size, and 10:1 to 12:1 for six- to eight-year olds).

We also saw little evidence to indicate that operating prekindergarten programs under the auspices of the public schools made a significant difference in the prevalence of two types of activities that are designed to enhance the transition of children from prekindergarten to kindergarten—those that involve coordination or communication between school and preschool levels and those that include parents as active participants in the process. The wide dispersion of the original sample of children from 55 Chapter 1-funded prekindergarten classrooms located in 49 buildings, to approximately 222 kindergarten classrooms located in 84 buildings, underscores the complexity of the policy issue when public schools seek to enhance the transition and continuity of experience for children.

Two types of activities related to coordination among preschool and kindergarten programs and teachers were found to occur to a greater degree in the school buildings housing kindergartens that enrolled sample children than in the nation's schools as a whole (Love, Logue, Trudeau, & Thayer, 1992):

- school principals were much less likely to indicate that the prekindergarten and kindergarten curricula were independent; and

- a larger percentage of prekindergarten staff participated in joint workshops with school staff on such issues as curriculum and child development.

These findings, taken together with the configurations of higher- versus lower-quality and half- versus full-day services that emerged when the characteristics of the Chapter 1-funded classrooms were compared to the main study sample, suggest a role for Chapter 1 in planning services for low-income children. First, school districts seeking to become a partner in the development of an early childhood system of education and care that comprehensively maximizes readiness for school must take a careful look across the mix of existing prekindergarten providers in their community in order to determine if, in fact, additional early childhood programs are needed. Rather than establishing "free-standing" Chapter 1-funded prekindergarten programs, it may be more efficient for the school district to support "slots" for children in existing prekindergarten programs or to work cooperatively to expand existing half-day prekindergarten programs to be full-day.

Second, the current practice of using Chapter 1 funds to extend half-day kindergarten programs to be full-day programs for eligible children may not serve to maximize the gains made by children in higher quality prekindergarten programs. Chapter 1 funds might better be used to enhance the quality of the kindergarten program by funding staff positions to reduce the child/staff ratio in kindergarten classrooms enrolling concentrations of Chapter 1-eligible children and by addressing issues related to the overall quality of the kindergarten program and the transition of children from prekindergarten to kindergarten. Efforts to further enhance the coordination and communication between prekindergarten and kindergarten programs and staff would permit them to begin to explore (a) the dynamics of quality early childhood programs in terms of classroom activities, grouping arrangements, and interactions; and (b) how these elements are established and sustained from year to year.

Conclusions

The Observational Study represents the first indepth look at the role of Chapter 1 in early childhood education. The substudy looked beyond more global measures of classroom quality to examine dynamics and processes thought to be associated with outcomes for children enrolled in Chapter 1-funded prekindergarten classrooms. At the same time, our conception of desired outcomes for children moved beyond more static measures of cognitive achievement to consider the social and mastery task behaviors of young children in classroom situations. Although the substudy was not able to investigate the relationship of discontinuity of experience to outcomes for children, it took a first step by comparing the quality of experience from prekindergarten to kindergarten. Each of these areas deserves further research that is focused on:

- systematically looking at classroom dynamics, considering the activities, grouping arrangements, and interactions among staff and children, that distinguish high quality programs from those that may be defined as "adequate" with an emphasis on examining what works best for particular types of children;

- examining the relationship of the goal-orientation and organizational skills of young children to later school success; and

- examining how discontinuity between prekindergarten and kindergarten affects young children's development and school success, and the differential effects of various approaches to transition.

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PREFACE

The *Observational Study of Early Childhood Programs* (the Observational Study) consists of two related studies: a descriptive study of 119 early childhood classroom environments (including Head Start programs, school-sponsored programs, and day-care centers) referred to as the main study and a substudy of approximately 750 children enrolled in 55 prekindergarten classrooms funded all or in part through Chapter 1 of the Hawkins-Stafford Elementary and Secondary School Improvement Amendments of 1988 (16 of these classes were randomly selected for inclusion in the main study sample of school-sponsored programs). The overall intent of the Chapter 1 substudy was to provide empirical information related to: (1) the relationships between Chapter 1-funded prekindergarten environments and children's cognitive and social-emotional development, and (2) how the programmatic experiences of children enrolled in Chapter 1-funded programs change from prekindergarten to kindergarten.[1]

A number of earlier reports provided background information related to the Chapter 1 substudy. Contents of these reports are as follows:

- *Recommendations for Measuring Cognitive and Social-Emotional Outcomes Among Chapter 1 Children* begins with a review of issues related to the assessment of young children, moves to a discussion of instrument selection criteria, and summarizes distinguishing characteristics of instruments that met these criteria. Appendix A contains a summary of outcome measures and instruments used in large-scale early childhood studies and recent state and local studies. Included in Appendix B is a preliminary screening of all candidate instruments. Appendix C includes profiles of instruments that met preliminary criteria; Appendix D includes a summary of responses to interviews with Chapter 1 program staff at the state and local levels regarding objectives, instructional approaches, and use of test instruments in Chapter 1-funded prekindergarten programs.

- The *Report on the Fall 1990 Pretest for the Chapter 1 Substudy* (Report #1) summarizes the instrumentation and schedule for collecting child outcome data and procedures used to select sites, school districts, classrooms, and children. A detailed summary of the sample size at each site and the overall quality of the fall 1990 pretest data concludes this report.

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[1] An original objective of the Chapter 1 substudy—to examine the relationships between the discontinuities that children experience from prekindergarten to kindergarten and child outcomes in kindergarten—was dropped because projections based on our prekindergarten data revealed that we were following too few children into kindergarten classes to detect meaningful classroom effects.

- The *Report of the Fall 1990 Pretest: Chapter 1 Substudy Report #2* describes the background characteristics of sample children by site and school district (based on background data collected as part of the fall 1990 pretest), psychometric analyses of fall pretest instruments, and relationships among background variables and child measures.
- The *Chapter 1 Substudy Report #3: Fall 1990-Spring 1991 Prekindergarten Assessments* updates the descriptions of background characteristics of sample children and their families by site and school district, based on data collected as part of the spring posttest, and uses posttest data to assess the children's growth from fall to spring.

The first report may be obtained from the ERIC Reproduction Service (ED 329 344).

The three latter reports are synthesized in *Volume III: Technical Appendices* of the Observational Study. The reader is also referred to *Volume I: Life in Preschool: An Observational Study of Early Childhood Programs for Disadvantaged Four-Year-Olds* for information in two areas directly applicable to the Chapter 1 substudy: (1) a review of relevant literature regarding the definition of early childhood program quality and factors that influence it, and (2) how program quality was operationally defined and measured in the sample classrooms.

CHAPTER ONE

INTRODUCTION

The recent emergence (some would say resurgence) of early childhood education on the national agenda may be traced to forces that have been building momentum over the last two decades. First, growing attention from policymakers and the general public to the problems of young children and their families, including dramatic changes in family structure and composition; increased labor-force participation of women with young children and consequent need for child care; alarming increase in school dropouts, adolescent pregnancy, drug use, youth crime and a growing recognition of the connection of these issues to early intervention; and the increasing numbers of female-headed households in poverty (Both & Garduque, 1989; Committee for Economic Development, 1987; Edelman, 1987; Ellwood, 1988; Levitan, 1981; Magnum & Pines, 1989; Zill, 1988). Second, a recognized body of research has emerged that demonstrates that children from low-income or high-risk environments do benefit from participation in *high-quality* early childhood programs and that these benefits translate into a reduced risk of school failure, economic benefits to society in terms of potential savings in school expenditures for special programs, savings in the criminal justice system, and greater economic independence through employment and earnings (Barnett & Escobar, 1987; Berrueta-Clement, Schweinhart, Barnett, Epstein, & Weikart, 1984; Balasubramaniam & Turnbull, 1988; Lazar, Darlington, Murray, Royce, & Snipper, 1982; McKey, Condelli, Granson, Barrett, McConkey, & Plantz, 1985; Weikart, 1989).

The current climate with heightened attention to the early years has created shifts in roles and relationships at the federal, state, and local levels, particularly in the area of increasing access to high quality early childhood education and care. Traditionally, the federal role has been to provide funding for early childhood programs for special populations that gets channeled to a variety of state and local agencies (National Association of State Boards of Education, 1988). Through the 1980s, states began to pay increased attention to educational reform and expanded their policy making related to early childhood education and care. Research conducted by Mitchell, Seligson, and Marx (1989) during the mid-1980s documented the growth of various early childhood initiatives within 28 states: state child-care subsidy programs, state dependent-care tax credits, state funding of special education for preschools, state-funded prekindergarten programs, state contributions to Head Start, and state support of parent education programs for prekindergarten children and their families. However, they found that only about half of the state early education efforts mandated comprehensively developed programs (i.e., that include provisions for health services, social services, and parent participation). Most recently, we are seeing school districts shifting to full-day kindergartens. Before and after school programs for young children are also on the rise (Seppanen, Love, deVries, Bernstein, Seligson, Marx, & Kisker, 1993).

As a result of this explosion of early childhood activity, states have been grappling with issues of program development, implementation, and refinement. According to W. Norton Grubb (1991):

> The current situation presents both promise and danger. The promise is that it will be easier, without an existing institution dominating early childhood programs, to develop a system *de novo*, considering alternative policies carefully and choosing those that best serve the interests of children. The danger is that, partly because the existing system on which further efforts must build is so chaotic and confusing, policymakers, especially at the state level, will be unable to grapple with the full range of options and to choose among them on the basis of clearly articulated goals, and will instead, under the pressure of "doing good," rush to adopt expedient but inappropriate policies. (p. 214)

One challenge in the coming decade, then, is to develop an early childhood *system* for poor children that comprehensively maximizes readiness for school. The split between "care" and "education" is clearly outdated (Bowman, 1990). The hallmarks of an early childhood system must include: a clearly articulated vision of what early childhood programs can be; consistently high quality programming; the development of strong connections among programs; and a coherent delivery system that provides for the cognitive, physical, social, and emotional development of children as well as the security of full-time child care for working parents. Chapter 1, as a funding source for early childhood programs, represents an opportunity for the public schools to influence the development of this system.

The Role of Chapter 1 in Early Childhood Education

Chapter 1 of Title I of the Elementary and Secondary Education Act of 1965 (reauthorized by Congress as part of the Hawkins-Stafford Elementary and Secondary School Improvement Amendments of 1988) is one of the oldest, most well-established federal education laws intended to provide supplemental instruction to low achieving students in schools with poor students. In 1990-91, $5.1 billion in Chapter 1 funds were granted to school districts with three-quarters of all elementary schools, half of middle and junior high schools, and one-quarter of high schools participating in Chapter 1 (Millsap, Turnbull, Moss, Brigham, Gamse, & Marks, 1992).

A small, but growing segment of the student population at the prekindergarten and kindergarten levels is served through Chapter 1. On the one hand, only 10 percent of the school districts receiving Chapter 1 funds use these funds in preschool programs or for full-day kindergarten programs (rather than the standard half-day). Looked at another way, Chapter 1 serves one-quarter of all preschool and kindergarten schools (settings in which a separate preschool or kindergarten building has been designated) that are under the auspices of the public schools (Millsap et al., 1992). Larger districts (enrolling 25,000 or more students) are much more likely to use Chapter 1 funds in prekindergarten and kindergarten than are districts enrolling fewer than 25,000 students (Millsap et al., 1992). Similarly, districts in the higher poverty quartiles (in which 21 to 100 percent of the students are poor) are more likely than districts in the lower poverty quartiles to use Chapter 1 funds in prekindergarten and kindergarten (Millsap et al., 1992).[1]

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[1] Poverty measure is the Orshansky index of poverty.

The 1988 Hawkins-Stafford Amendments also created the Chapter 1 Even Start program to improve the educational opportunities of disadvantaged children and adults by integrating early childhood education, parent education, and adult basic education into a unified program. Focusing on the parent and child as a unit, the Even Start legislation mandates that the grant recipient (which may be a school district or a community-based organization) work collaboratively with Head Start programs, community service agencies, adult education programs, and other federally-sponsored family support initiatives for low income clients (e.g., the Job Training Partnership Act, Job Opportunities and Basic Skills Training Program, and the Women, Infants, Children nutrition program) to provide services to enrolled families. Initiated with 76 federal demonstration grants in fiscal year 1989, Even Start became a state-run program in fiscal year 1992 after federal funding reached $50 million.

The growing role of Chapter 1 in early childhood education has raised a number of issues for state and local education officials:

- A growing commitment to the early development of children by the public schools will involve the reallocation of existing Chapter 1 resources. In order to provide quality programs and services that have been demonstrated to positively influence outcomes for children, school districts will need to commit sufficient resources and resist pressures to serve more children with lower quality programs and less intense services. As districts take steps to serve more prekindergarten and kindergarten children through Chapter 1, they will not be able to simply reassign existing staff who lack sufficient background and training to work with this younger population;

- Entering the arena of existing service providers in the community is a confusing proposition for school districts. The fragmented, nonsystem of early childhood programs and services that exists in our communities will require an array of different responses by districts. Although the initiation of public school-based early childhood classrooms with Chapter 1 funds might make sense in one community, it may serve to further fragment existing services and segregate children by economic status in another;

- Current Chapter 1 legislation is not compatible with a nationally growing stance against group-administered, paper-and-pencil tests for young children in favor of more "authentic" assessment strategies such as checklists completed by teachers and parents and direct observation scales. Local school districts have found it difficult to develop an appropriate response to the school and community needs assessment process required under Chapter 1, the selection of young children for Chapter 1 participation, and the annual review of child performance;

- There is a lack of consensus of how best to create program models that promote basic and advanced skills for young disadvantaged children; and
- A pervasive concern exists that the development of free-standing Chapter 1-funded prekindergarten programs targeting the neediest children will stigmatize these children as "low achievers" as they start their school careers.

Objectives of the Chapter 1 Substudy

The substudy of Chapter 1-funded early childhood programs examines relationships between Chapter 1 prekindergarten environments and children's cognitive and social-emotional development and describes how the programmatic experiences of children change from prekindergarten to kindergarten. The investigation targeted three major objectives:

Objective 1. Investigate variation across Chapter 1-funded programs in structural and environmental characteristics, interactions between caregivers and children, and the nature of children's activities.

To satisfy this objective we focused on attributes of classroom environments and processes that have long been considered key determinants of quality, including: the pattern and content of activities and groups across the school day, the behavior and interactions of teaching staff, and the behavior and interactions of children. In addition, we considered aspects of the early childhood program that may influence what goes on in the classroom, including: *program characteristics* (e.g., length of program day, leadership style of the director, parent involvement, services for families, staff stability, teacher salaries, professional opportunities for staff, characteristics of children and families served), *staff characteristics* (e.g., teacher's level of formal education, early childhood training, length and type of teaching experience, teaching philosophy), *classroom characteristics* (e.g., presence of one or more children with special needs, stability of the relationship between teacher and children), and *classroom structure* (e.g., size of group, ratio of children to teaching staff, number of staff in the classroom, proportion of time when only one staff member is present, presence of volunteers in the classroom).

Objective 2. Relate Chapter 1-funded prekindergarten classroom characteristics and processes to child outcomes.

In order to satisfy this objective, we had to measure outcomes in two domains relevant to the impact on children of high-quality early childhood program participation: cognitive development and social-emotional adjustment to the school setting. As part of our instrument review and selection process, we sought answers to two questions. First, what outcomes are pertinent to Chapter-1 funded prekindergarten programs? Our early contact with Chapter 1 directors indicated that Chapter 1-funded prekindergarten programs tend to use a developmental approach that emphasizes language enrichment and the development of basic skills or academic readiness skills.

Second, we wanted to know the current thinking of child development experts regarding outcomes that are developmentally important for young children. We found that although the "whole child" approach has been increasingly recognized by early childhood practitioners, child development theorists and researchers have been slow to respond with relevant measures (Aber et al., 1986). More and more, scholars are recognizing that cognitive development cannot be separated from social-emotional development, motivation, personality, and physical development (Block & Block, 1980; Cicchetti, Carlson, Braunwald, & Aber, 1986; Sroufe, 1979). Advances and lags in one domain of a child's development have implications for development in other domains and assessments of development are more sensitive and accurate when the interrelationships among domains are considered.

At the same time, researchers in academic achievement have been placing growing emphasis on assessing children's adjustment to school and motivation to learn as differentiated from their sheer intellectual capacity to learn (Aber et al., 1986). A related issue, according to Chandler and Chapman (1991), is what is called

> the "locus" of competence (or structure) either as a categorical attribute of the individual alone or as a relational characteristic of individuals within a particular social and ecological context. The traditional assumption has been that

> competence is resident in the individual psyche. An alternative, more contextual approach . . . . concludes that competence is best understood, not as an attribute of individual children only, but of a complex that includes children as well as the social supports available to them. (p. 261)

This development represents a shift away from more static measures of intellectual ability or cognitive development and toward the use of more dynamic assessments of classroom interactions, learning strategies, and motivational processes. Assessment approaches that include the use of teacher rating scales, classroom-based observation, and the review of work samples are being promoted to both practitioners and researchers (Bredekamp & Shepard, 1989; Meisels, 1989; National Association for the Education of Young Children, 1991). The Chapter 1 substudy contributes to this movement by stressing the importance of general readiness to learn rather than focusing on more content specific child outcomes. In the Chapter 1 substudy, more traditional individual assessments of child outcomes were augmented with a teacher rating scale and a classroom-based observation measure.

Objective 3. Examine how the programmatic experiences of children enrolled in Chapter 1-funded prekindergarten programs change from prekindergarten to kindergarten.

It has long been recognized that many children reared in poverty are not as successful in school as are children from more affluent backgrounds. Public concern over this discrepancy has motivated policymakers and educators to attempt to rectify it through a range of initiatives for children and families. Some of these initiatives indicate that children from low-income families, when served in high quality preschools and early intervention programs, show impressive short-term cognitive and social gains. Unfortunately, such relative gains are often not retained beyond third grade.

Intervention programs based on deficit models are beginning to embrace another perspective. Rather than perceiving children who are economically disadvantaged as the only group that requires change (i.e., to be ready for school), the current view sees the school and the community as needing to change as well to be ready for all children (National Association for the

Education of Young Children, 1990). Interest among public school personnel and policymakers in creating smooth transitions for children between prekindergarten and kindergarten is now apparent in the policy statements and standards for practice of professional organizations (e.g., National Association of Elementary School Principals and the National Association for the Education of Young Children).

Continuity of experience for its own sake, however, has no inherent value. Kagan (1990) suggests that program quality must be considered when studying continuity, that continuity is more complex than merely comparing prekindergarten and kindergarten curricula. *Continuity of philosophy* (i.e., assumptions about the roles of teachers and parents and about learning and development), *continuity of pedagogy* (i.e., instructional and disciplinary strategies), and *continuity of structure* (i.e., class size, staff child ratios, teacher training, teacher salaries, family support services, policies for coordination and collaboration) are all important dimensions that must be acknowledged in order to design and implement effective transitions for young children.

From the perspective of Head Start, one of the largest federally-funded providers of early childhood education for children who are economically disadvantaged, transition is viewed currently as a process that involves a continuous and integrated array of comprehensive services for children and their families that begins at entry into the Head Start program and continues at least through the third grade. From this perspective, early childhood programs (prekindergarten through the third grade) must be prepared to provide as wide a range of learning opportunities as the variation in the functional levels of the children they serve; to provide services for families which assist them in providing a nurturing, stable, and self-sufficient environment that can enhance the child's development; and to provide parents with opportunities to participate as full partners in the education of their children.

The above understanding suggested a two-pronged approach for examining continuity and transition in the Chapter 1 substudy. We needed both (1) to investigate the nature and degree of discontinuity experienced by children as they go from Chapter 1-funded prekindergarten to kindergarten by comparing the characteristics of the two environments, and (2) to analyze the policies and practices of prekindergarten and/or kindergarten programs that were designed to assist transition and reduce discontinuities. The Chapter 1 substudy was not able to examine the relationships between continuity and outcomes in kindergarten due to inadequate statistical power from having followed so few children into kindergarten.

Organization of the Chapter 1 Substudy Final Report

In the following chapter (Chapter Two) we describe our general approach to the Chapter 1 substudy, including our research questions, sampling strategy, child-level and classroom-level measures, and study implementation. Chapter Three focuses on the characteristics of Chapter 1-funded prekindergarten programs and the staff who work in them. Chapter Four presents our findings on the relationships between selected Chapter 1 prekindergarten program characteristics and children's social and cognitive development. In Chapter Five, we present findings related to continuity/discontinuity of experience from prekindergarten to kindergarten and the extent to which children and families are guided through this transition process. In Chapter Six we present our conclusions and their implications for policy and practice.

Three appendices provide additional background and detail for the interested reader. Appendix A describes the use of Chapter 1 funds in prekindergarten and implications for the Chapter 1 substudy sampling plan. Appendix B summarizes the rationale for changing the Chapter 1 substudy design as we went into the kindergarten year of data collection. In Appendix C, we discuss the psychometric characteristics of the child observation measure, the Bronson Social and Task Skills Profile, and other issues related to its use in the substudy.

CHAPTER TWO

GENERAL APPROACH

In this chapter we discuss our general approach to the Chapter 1 substudy, concentrating on key methodological issues: sampling of school districts, classrooms, and children; classroom and child-level measures; and data collection and analysis procedures. The interested reader is referred to *Volume III: Technical Appendices* for a more in-depth discussion of the sampling plan and measures.

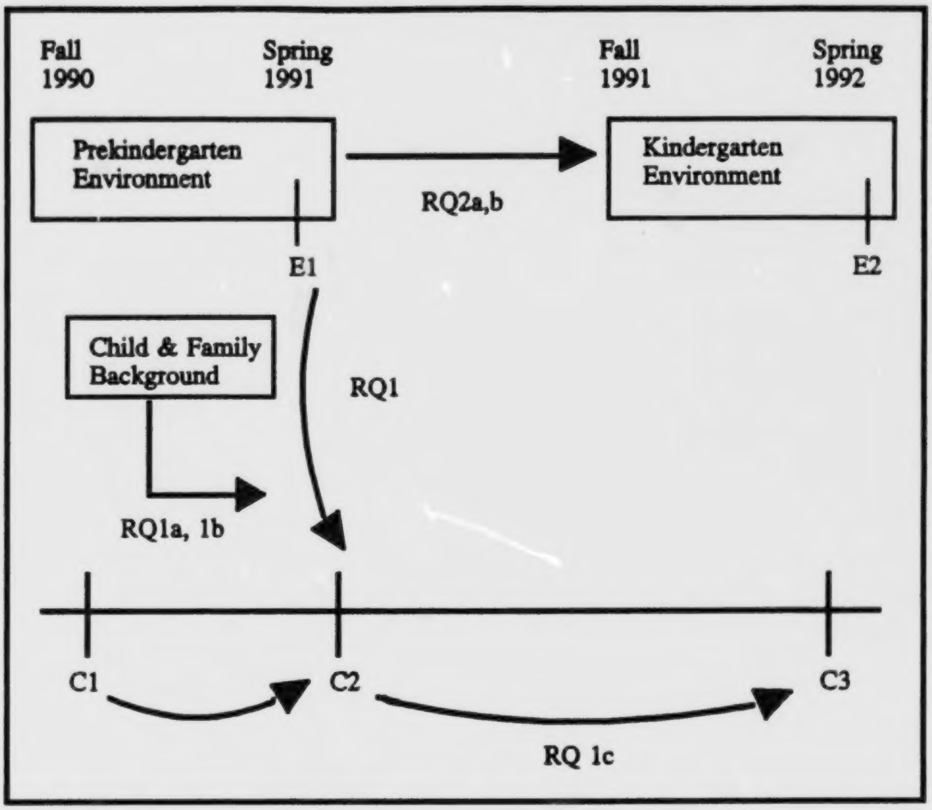
Method

The Chapter 1 substudy examined the relationships between Chapter 1-funded prekindergarten classroom environments and children's cognitive and social-emotional development and how the programmatic experiences of children change from prekindergarten to kindergarten. The substudy design included individual assessments of the cognitive and social-emotional development of children enrolled in Chapter 1-funded programs during the fall and spring (1990-1991) of their prekindergarten year. Classroom observations and interviews of school principals and teachers in spring 1991 provided data on classroom characteristics and processes. A subset of sample children was followed into kindergarten and in the spring (1992) their kindergarten classes were observed and their cognitive and social-emotional development was again assessed. Exhibit 2.1 represents this design, linking the collection of child- and classroom-level data to each data collection episode and to specific research questions.

Sample Selection

The Chapter 1 substudy included distinct sampling schemes at three levels: sites and school districts that we chose purposively to reflect geographic and regulatory diversity, prekindergarten classrooms that we selected to maximize variation on structural classroom characteristics and classroom dynamics, and enrolled children who were sampled randomly.

Exhibit 2.1
Design of the Chapter 1 Substudy


Fall 1990
Spring 1991
Fall 1991
Spring 1992
Prekindergarten Environment
RQ2a,b
Kindergarten Environment
E1
E2
Child & Family Background
RQ1
RQ1a, 1b
C1
C2
C3
RQ 1c

Research Questions:

1. How are children's experiences and caregiver practice related to cognitive and social-emotional outcomes for children enrolled in Chapter 1 preschool programs?
   - a. What are the relationships between children's experiences and caregiver practice and outcomes when children's family background is taken into consideration?
   - b. How do these vary for different outcomes?
   - c. How stable are these outcomes from preschool to kindergarten?
2. How do the educational experiences of children enrolled in Chapter 1 programs change from preschool to kindergarten?
   - a. What discontinuities do children experience?
   - b. How are children guided through the transition process?

Data Collection:

E1 = Observations of prekindergarten classroom environment; teacher and principal interviews.
E2 = Observations of kindergarten classroom environments; teacher and principal interviews.
C1 = Fall pretest of child outcomes and collection of child and family background information.
C2 = Spring prekindergarten posttest of child outcomes and collection of child and family background information.
C3 = Spring kindergarten posttest of child outcomes and collection of updated child background information.

The final sample, as of fall 1990, consisted of 16 school districts, 55 classrooms located in 49 buildings (with a range of one to six classes per program), and 783 prekindergarten children (refer to Exhibit 2.2). Approximately 73 percent of sample children were eligible for free or reduced-price lunch (7 percent of sample children were not eligible, and data were not available for the remaining 20 percent).

Exhibit 2.2
Number of Participating Districts, Classes, and Children by Site
Fall 1990

Site	District	Buildings	Classes	Children	Site Total
California	Richmond	3	4	51	
	San Francisco	6	6	79	130
Florida	Broward	4	4	63	
	Dade	5	5	75	138
Michigan	Crestwood	1	1	12	
	Ecorse	1	2	19	
	Ann Arbor	3	3	36	
	Highland Park	3	5	65	
	Southfield	1	2	32	164
New Jersey	Linden	1	1	13	
	Newark	4	4	61	
	Rahway	3	3	42	
	Scotch Plains	2	2	23	139
Texas	East Central	1	2	34	
	Edgewood	6	6	99	
	Northside	5	5	79	212
Totals	16	49	55	783	

The kindergarten follow-up sample, as of spring 1992, consisted of 48 classes located in 14 school districts that enrolled 131 sample children (refer to Exhibit 2.3).

Exhibit 2.3
Number of Participating Districts, Classes, and Children by Site
Spring 1992

Site	District	Buildings	Classes	Children	Site Total
Florida	Broward	6	6	8	
	Dade	6	6	14	22
Michigan	Crestwood	2	2	5	
	Ecorse	2	2	5	
	Ann Arbor	2	2	4	
	Highland Park	3	3	21	
	Southfield	3	3	6	41
New Jersey	Linden	2	3	6	
	Newark	3	3	9	
	Rahway	3	3	8	
	Scotch Plains	3	3	8	31
Texas	East Central	4	4	10	
	Edgewood	4	4	18	
	Northside	4	4	9	37
Totals	14	47	48	131	

Selection of Sites and School Districts

The five sites and 16 school districts were not intended to be nationally representative, but were chosen purposively to reflect geographic and state regulatory diversity. Two other considerations influenced site selection: the need for adequate numbers of different types of programs serving four-year-olds from low-income families to meet the sampling requirements of the main study, and the need for sufficient numbers of early childhood programs funded all or in part with Chapter 1 funds to meet our sampling criterion of approximately 150 children per site. These latter requirements turned out to be very influential in site selection, because of the relatively small number of school districts nationwide that are currently using substantial amounts of Chapter 1 funds for prekindergarten programs.[1] The five sites selected were:

- San Francisco and Contra Costa Counties (California)
- Bexar County (San Antonio, Texas)
- Dade and Broward Counties (Miami and Fort Lauderdale, Florida)
- Oakland, Wayne, and Washtenaw Counties (Metropolitan Detroit, Michigan)
- Union, Hudson, and Essex Counties (Metropolitan Newark, New Jersey)

Once the sites were selected, we created a sampling frame of school districts offering Chapter 1-funded prekindergarten programs in each site and called Chapter 1 directors to obtain additional information about the programs. We hoped to randomly select five school districts in each site that met the following criteria:

- sufficient numbers of classrooms and children (ideally, at least two classrooms serving 30 four-year-old children);
- classrooms enrolling concentrations of children from economically disadvantaged families (defined as eighty percent or more of children eligible for free or reduced-price lunches under the National School Lunch Program);
- services school-based rather than predominately home-based.

The random selection plan was dropped in favor of a more purposive selection process when it was found that many school district boundaries conform to county lines and/or that sometimes only two or three districts fell within a particular county. Districts having Chapter 1 prekindergarten classes in which less than 80 percent of the children were economically disadvantaged were considered as alternates to be used only if districts meeting all our criteria declined to participate in the study. Due to some target districts declining to participate, we ended up with 16 districts after adding from our alternate lists in Michigan and New Jersey. This led to the inclusion of four districts in which less than 80 percent of children in Chapter 1 prekindergarten classes qualified for free or reduced-price lunch. The trade-off was made, however, to allow us to increase the number of districts participating and maximize variation in school district policies and community characteristics associated with classroom-level structural variables.

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[1] Refer to Appendix A for a discussion on the use of Chapter 1 funds for prekindergarten programs and its impact on the study's sampling frame.

Selecting Prekindergarten Classes

We used the following guidelines to specify the targeted number of classes for selection from each participating school district:

- the overall number of children targeted for assessment proportional to the size of the district's Chapter 1 prekindergarten enrollment (as compared to other participating school districts within a particular site);
- classes taught by different teachers; and
- ideally, one class per building in order to maximize variability on classroom-level structure and process variables.

Across all the sites, the initial pool of buildings and classes was reduced due to one or both of the following factors. First, Chapter 1 prekindergarten classes in a number of school districts were housed in one early childhood center or in very few elementary school buildings in the district. In these instances, we selected multiple classes taught by different teachers in a building to maximize variability in classroom-level structural and process variables. Second, a few district contact people set a condition that participation by building principals and/or teachers be voluntary. When a few teachers declined to participate, we increased the target number of classes correspondingly in another district (generally from within the same site) in order to maintain the overall number of participating classes at approximately 50. These two types of adjustment were required in five of 16 participating school districts.

Selecting Children

In each classroom, approximately 15 children and a small number of alternates were selected randomly for assessment. In a few target classes, it was impossible to reach the target number of children because either fewer than 15 children were enrolled or parents declined to give permission for their children to be tested. To reach our overall target of approximately 150 children per site, child assessors added children from alternate lists of other target classes in the district.

Kindergarten Sample Size and Distribution

The original design assumed that sample children would be followed into kindergarten, and in the spring of 1992 their kindergarten classes would be observed (using the main study observation instruments), and their cognitive and social-emotional development again assessed. We always knew that only a subset of original sample children would be assessed in kindergarten for two reasons: (l) attrition, which we projected at 10 percent per year, and (2) the need to collect and analyze both classroom-level and child-level data would require us to select kindergarten classrooms in which sample children were clustered. As a result, we projected that sufficient numbers of children would cluster in a subset of 100 to 150 kindergarten classes, based on patterns of kindergarten assignments described by staff from the 16 participating school districts, and the relatively low sample attrition rate from fall 1990 to spring 1991.

Attrition turned out to be consistent with our predictions (except in one school district in California), but children did not end up clustered in kindergarten classrooms to the extent we had projected. As of December 1991, sample children were enrolled in approximately 222 classrooms. Four or more children were clustered in each of 44 of these kindergartens—a total of 226 children—and the remaining children were widely dispersed (one to three children per classroom).

Preliminary analyses indicated we would not have sufficient statistical power to answer the principal research questions. This led us to revise the original kindergarten year sampling plan and data collection strategy (refer to Appendix B for a discussion of the rationale for this decision). We dropped one of the five sites in which attrition and dispersion were quite extensive. Our revised design called for collecting data in 48 kindergarten classrooms distributed evenly across four sites and proportionally across districts within each site.

Selection of kindergarten classes. The overall intent of selecting kindergarten classes was to describe the kindergarten experiences of sample children and to compare classroom environments to those of their 1990-91 prekindergartens. As such, we wanted to maximize variability on classroom-level structural and process variables and so specified that the 12 classes selected at each site be located in different buildings and be taught by different teachers. We used a five-step process for selecting the targeted number of classes from within each school district:

- identify classes enrolling at least one sample child (that is, a child who was assessed the previous year);
- eliminate: (a) prekindergarten classes (i.e., those enrolling sample children who were repeating prekindergarten) and (b) classes not under the auspices of the school district (we had follow-up information on a few children enrolled in parochial schools);
- randomly select buildings until targeted number reached;
- randomly select one class from each building;
- randomly select one alternate class (taught by a different teacher) in each building; if alternates not available, randomly select another building/class in the district (the alternate was used in cases when the teacher declined to participate or when all sample children withdrew from the class).

Representativeness of the Sample

Based upon indepth knowledge of the communities in the study and extensive experience in the field, we believe that the sample of classrooms represents the range of quality in Chapter 1-

funded prekindergarten programs with certain limitations. Due to restrictions in the number of useable sites outlined earlier, site selection was confined to urban and suburban settings. For the purposes of data collection and analysis, no rural sites could be located in which either there were sufficient numbers and concentrations of school districts using Chapter 1 funds to support prekindergarten programs or there were sufficient numbers of children enrolled. Remember, too, that we did not sample Chapter 1-funded prekindergarten classrooms randomly from the national population of such classrooms. Therefore, our results were not expected to be proportionally representative of all the different characteristics and quality of Chapter 1 funded classrooms across the nation. However, adequately addressing the Chapter 1 substudy's primary issues required sufficient representation of classrooms in terms of population served, location, and regulatory diversity. As will be seen, however, the Chapter 1-funded classrooms in our sample varied little on many of the structural variables of interest.

The Measures

To empirically investigate the influence of classroom characteristics and processes on children's cognitive and social-emotional development we collected a wide variety of child-level and classroom-level data using a number of instruments.

Child-Level Measures

Child-level measures included data on the cognitive and social-emotional development of individual children as well as child and family background characteristics.

Child and family background characteristics. We collected limited background information from three sources: parents, teachers, and student records. Child background information included date of birth, gender, ethnicity, language preference, type of preschool experience, eligibility for free or reduced-price lunch, attendance, factors limiting classroom participation, special needs, and residence of the child during the school year. Family background information included mother's and father's education levels, marital status of mother, age of mother at birth of first child, number of adults living in household, and two questions related to expectations for the educational achievement of the child. Both English and Spanish versions of forms completed by parents were available.

__Child outcome measures__. Four child outcome measures were used,

- Preschool Inventory (PSI)
- Child Behavior Rating Scale (CBRS)
- Bronson Social and Task Skills Profile
- Peabody Picture Vocabulary Test-Revised (PPVT-R)

The Preschool Inventory (PSI) is a brief, 32-item assessment of cognitive achievement designed to be administered individually to children in the age range of three to six years in either English or Spanish. The PSI was developed by Betty Caldwell to provide a measure of achievement in areas regarded as necessary for success in school and to demonstrate changes in general cognitive development associated with educational intervention. The test takes about 15 minutes to administer and covers the following areas: general information; labeling; perception of shapes; concepts such as over, under, behind; and visual-motor skills. Response modes required of the child are oral, pointing, or motor, as appropriate. Each item is scored by the assessor as correct, incorrect, or does not know. Higher PSI scores reflect greater cognitive achievement. The PSI has been used in numerous national early childhood studies in recent years.

The Child Behavior Rating Scale (CBRS) is a 32-item behavioral rating scale adapted in part from the coding categories of the Bronson Executive Skill Profile (Bronson, 1975; 1985) and an earlier version of the CBRS that was created by RMC Research Corporation for use in a Head Start evaluation (Meleen, Love, & Nauta, 1988). The CBRS is designed to evaluate a child's social behavior, with peers and with adults, and task behavior. Thirty-two behaviors are rated on five-point scales to indicate how frequently they occur (never, rarely, sometimes, frequently or usually/always). We computed the mean rating for all items. The CBRS requires 10 to 15 minutes per child and was completed by the classroom teacher.

The Bronson Social and Task Skills Profile (the Bronson) is an observation measure that was adapted from the Bronson Executive Skill Profile by the instrument's original developer, Martha Bronson, for use in the Chapter 1 substudy. The Bronson uses structured categories to record a child's performance in the planning and organizing of mastery tasks (puzzles, matching and sorting tasks, number and letter tasks, etc.), in interacting cooperatively with others, and in carrying out tasks and social interactions successfully. Social and mastery task behavior is observed by a child assessor as it occurs in the natural setting of the classroom during four to six ten-minute observations over a two-week period of time. A modified time sampling method is used in which half of the observations are begun at the beginning of social interactions and half are started at the beginning of mastery tasks. Optimally, observations are scheduled in classrooms during free-choice periods when children have some control over their selection of activities.

The Peabody Picture Vocabulary Test-Revised (PPVT-R) is an untimed test of receptive vocabulary that typically takes 15 to 20 minutes to administer individually to a child aged 2.5 years or older. The cognitive ability measured by the PPVT-R is relatively narrow, restricted to receptive vocabulary. We used the PPVT-R in kindergarten because of possible PSI ceiling effects in children over the age of five. Since the Chapter 1 substudy was concerned more with the stability of process-outcome relationships than with tracking developmental growth over time, shifting from the PSI to the PPVT-R for the kindergarten assessment was not considered a problem. A Spanish version, the Test de Vocabulario en Imagines Peabody (TVIP), has the same structure and standard score system as the PPVT-R.

The results of psychometric analyses related to the PSI, CBRS, Bronson, and the child and family background measures are presented in *Volume III: Technical Appendices.* Issues related to the use of the CBRS and Bronson Social and Task Skills Profile as child outcome measures are highlighted at the end of the Chapter 1 substudy report in Appendix C.

Classroom-Level Measures[2]

We collected data on classrooms and to some extent on programs as a whole. In selecting classroom-level instruments, we focused a good deal of attention on identifying and selecting direct observation measures of classroom processes. We relied on individual staff interviews for program and classroom characteristics (such as staff qualifications), that could be measured through more indirect means.

Classroom observation measures. As part of the main study, Abt Associates (AAI) reviewed a large number of existing observation instruments for their appropriateness to the full set of research questions in the study. Although several instruments measured relevant constructs, no single instrument or set could address all of the components of interest. Abt Associates, therefore, developed two new observation systems to supplement existing instruments identified for use in the study. Unless otherwise noted, instruments were used during observations of both prekindergarten and kindergarten classroom environments. These instruments include:

- Preschool Classroom Snapshot
- AAI Child-Focused Observation
- AAI Adult-Focused Observation
- Description of Preschool Practices (DPP)
- Assessment Profile for Early Childhood Programs
- Early Childhood Environment Rating Scale (ECERS)
- Arnett Global Caregiver Rating Scale

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[2] Information in this section is from *Volume I: Life in Preschool, An Observational Study of Early Childhood Programs for Disadvantaged Four-Year-Olds*, prepared by Abt Associates. Included in the report are descriptions, scoring procedures, and reliability estimates for the classroom-level measures.

The Preschool Classroom Snapshot (Snapshot) allows an observer to record the activities and groupings of all adults and children in a classroom at a given moment. The observer allocates individuals across twenty-four activities and indicates the sizes of groups (numbers of both children and adults) involved in each activity. It also provides a means for recording the child/staff ratio at the time of the Snapshot and the number of children fighting, crying, arguing, being comforted or being disciplined. Multiple Snapshots were recorded in classrooms, at regular time intervals. The Snapshot is based on the SRI Classroom Snapshot (Stallings, 1975).

The AAI Child-Focused Observation (Child-Focused Observation) records the behavior of each child in a classroom on a time-sampled basis. The observer follows children one at a time, selecting them at random until all are observed. Observations are conducted in half-hour periods, during which four children are observed for seven and one-half minutes each. The observer records what the child is doing, the number of other children involved with the child, and whether the child is in a social or a nonsocial situation. In the case of social interactions with peers, the observer records the child's use of language and his or her cooperative or negative social strategies. In the case of social interactions with an adult, the observer codes the type of interaction and the caregiver's tone and responsiveness. The Child-Focused Observation is a new instrument that was developed for the current study and was used only during the prekindergarten data collection episode due to resource constraints and changes in the study's design.

The AAI Adult-Focused Observation (Adult-Focused Observation) allows an observer to record the behavior of the target teacher in a classroom on a time-sampled basis. After a brief observation period, the observer records a number of pieces of information about the teacher's behavior, including type of involvement with children, number of children with whom she is involved, verbalization and language spoken, content of teaching, and techniques for communicating. If there are two or more staff in the classroom, observations are split between the teacher and one other staff member. The target teacher is observed for two to two-and-one-half hours per observation day. The Adult-Focused Observation is based on an existing observation system developed by Jean Carew and by Abt Associates and was used in the 1977 *National Infant Care Study*. For the present study it was modified to make it more appropriate to prekindergarten and kindergarten settings.

The Description of Preschool Practices (DPP) allows an observer to rate the developmental appropriateness of both early childhood classroom environments and the caregivers' behavior. The observer rates a classroom on 27 items using a five-point Likert scale (1 = not at all like this classroom, 3 = somewhat like this classroom, 5 = very much like this classroom). The items on the scale are based on the NAEYC *Developmentally Appropriate Practice in Early Childhood Programs Serving Children From Birth Through Age 8* (Bredekamp, 1987) and an earlier version that was developed by Marion Hyson for use in the *Academic Environments Study* (Hyson, Hirsh-Pasek, & Rescorla, 1990). Separate averages were computed for the 14-item Inappropriate (i.e., academic) Practices Subscale and the 13-item Appropriate (i.e., developmental) Practices Subscale.

The Assessment Profile for Early Childhood Programs (Assessment Profile) (Abbott-Shim & Sibley, 1987) provides a structured observation checklist for assessing the quality of early childhood programs. The measure includes items coded yes/no on safety and health, learning environment, scheduling, curriculum, interacting, and individualization. It is completed on the basis of at least one day of observation of the classroom. The Assessment Profile was omitted from the kindergarten data collection episode because analysis of the prekindergarten classroom data indicated that the measure was very similar to the ECERS (described next).

The Early Childhood Environment Rating Scale (ECERS) (Harms & Clifford, 1980) is another measure of the quality of early childhood programs. The ECERS consists of 37 items covering several areas: personal care routines of children, furnishings and displays for children, language-reasoning experiences, fine and gross motor activities, creative activities, social development, and adult needs. The observer rates the classroom on each item using a seven-point scale (inadequate to excellent). The scale can be completed based on a half-day of observation, but we asked data collectors to base ratings on the entire observation episode. Analyses completed as part of the Chapter 1 substudy used only the overall item average score due to the subscales' unreliability in previous studies and the comparatively better reliability of the overall score.

The Arnett Global Rating Scale of Caregiver Behavior (Arnett) (Arnett, 1989) allows an observer to assess a caregiver's emotional tone and responsiveness to children in the classroom. The scale consists of 26 items. The observer rates the caregiver on each item using a four-point scale (1 = not at all to 4 = very much). The rating scale has been used in a number of research studies, including the *National Child Care Staffing Study* (Whitebook, Howes, & Phillips, 1990). Arnett subscales and the items included in them, have been determined by investigators through different factoring techniques (e.g., Arnett, 1989; Love, Ryer, & Faddis, 1992). The instrument has yielded four or five subscales that investigators have named similarly and on which nearly identical subsets of items loaded. In keeping with the main study, analyses in the Chapter 1 substudy were confined to the most dominant first factor, Warmth/Responsiveness, and the second factor, Harshness. The two subscale scores were computed simply as means across the factor items.

Interviews. Interviews were conducted with the teacher in each observed classroom and with the principal or director responsible for the building housing the classroom. We adapted questionnaires used previously in Mathematica Policy Research, Inc.'s study, *A Profile of Child Care Settings: Early Education and Care in 1990* (Kisker et al., 1991) and as part of RMC Research's *National Transition Study* (Love, Logue, Trudeau, & Thayer, 1992).

The Teacher Interview covered the following topics: teacher background and experience, training and staff development, teaching approach, parent involvement, curriculum planning, leadership style of the principal, and the teacher's views on developmentally appropriate practices.

Questions were added to the kindergarten teacher interview on activities meant to smooth children's transitions from prekindergarten to kindergarten.

The Director Interview was used with the principal or director of each school building housing a Chapter 1-funded prekindergarten classroom. Information was collected in the following areas: general background characteristics of the school and program, enrollment policies, vacancies, staff, curriculum, activities, characteristics of enrolled children, staff salaries, and program income. For the kindergarten year, the Director Interview was revised substantially in order to focus on background characteristics of the building's kindergarten program, parental involvement, principal's instructional philosophy, and the extent of activities meant to enhance transition and ensure continuity between the Chapter 1 prekindergarten and kindergarten (based on items from a survey instrument used in the *National Transition Study*).

Data Collection Procedures

Data were obtained at three time points: (1) fall 1990, between October 15 and December 7 (child-level measures), (2) spring 1991, between March 27 and May 24 (child-level and classroom-level measures), and (3) spring 1992 between April 6 and May 29 (child-level and classroom-level measures). The data collection team at each site consisted of child assessors who were trained to complete either the cognitive measures or the Bronson Social and Task Skills Profile, data collectors who were trained to complete the full battery of classroom-level measures, and a field coordinator.

Collection of Child-Level Data

Instrumentation varied by data collection episode as indicated in Exhibit 2.4. During the spring 1991 data collection episode, each sample child was assigned to one of four two-week blocks between April 1 and May 17 that corresponded to the date that he/she had been assessed in the fall using the PSI. Due to various scheduling issues this procedure met with mixed success.

The average number of days between the fall and spring administrations of the PSI was approximately 173 with a standard deviation of 13.3. The number of days between test dates ranged from 140 to 213. The Bronson observations were completed by child assessors who spent approximately two weeks in each class on days in which PSI administrations or classroom-level observations were not scheduled. During each data collection episode, teachers completed the CBRS rating forms.

The quality of data collected was monitored by both the field coordinator and staff members at RMC Research. Findings related to the reliability and validity of all measures are presented in *Volume III: Technical Appendices*; Bronson data are discussed in depth in Appendix C.

Collection of Classroom-Level Data

The schedule for administering each of the observation measures by data collection episode is summarized in Exhibit 2.5. Each data collector completed the full battery of observation instruments for a particular classroom. During spring 1991, a data collector spent one week in each of the 55 Chapter 1-funded prekindergarten classrooms observing and coding classroom activities, groupings, and staff and children's behavior. During spring 1992, data collectors spent two days in each of 48 kindergarten classrooms completing many of the same data collection procedures.[3] During the course of each observation episode, data collectors also interviewed classroom staff. The principal or director of the school building that housed the classroom was interviewed by the field coordinator.

The quality of classroom-level observation and interview data was monitored primarily by the field coordinator at each of the sites. The initial training of the observers was reinforced

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[3] Analysis of the classroom-level data by Abt Associates indicated that reliable data could be obtained in two days of observation.

Exhibit 2.4
Schedule for Administering Child Measures

Episode	Instrument	Administered/Completed by
Fall 1990	About Your Family	Parents (along with permission form)
	Preschool Inventory (PSI)	Child Assessors
	Child Behavior Rating Scale (CBRS)	Pre-K Chapter 1 Teachers
Spring 1991	Preschool Inventory (PSI)	Child Assessors
	Child Behavior Rating Scale (CBRS) and Child Background Information	Pre-K Chapter 1 Teachers
	Bronson Social and Task Skills Profile	Child Assessors
	Child Background Information Form	Child Assessors
Spring 1992	Peabody Picture Vocabulary Test-Revised	Child Assessors
	Child Behavior Rating Scale (CBRS) and Child Background Information	Kindergarten Teachers

subsequently in weekly review meetings among field coordinators and data collectors. As part of the 1991 data collection episode, a retraining session was conducted at each site by the two senior project staff members responsible for the original training. Since a majority of the field coordinators and data collectors returned for the 1992 data collection episode, all staff members were brought together for refresher training and then technical assistance was provided on an as-needed basis via telephone to answer questions. Field coordinators collected field reliability data for the two time-sample observation measures by observing and coding alongside every observer at least once during each data collection episode.

Exhibit 2.5
Schedule for Administering Classroom Observation Measures

Chapter 1-Funded Prekindergarten Classrooms Spring 1991					
Measure	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**
Global Ratings					
ECERS	------------------	------------------	------------------	--------------->	completed based on 5 days of observation
Assessment Profile	------------------	------------------	------------------	--------------->	completed based on 5 days of observation
Description of Preschool Practices	------------------	------------------	------------------	--------------->	completed based on 5 days of observation
Micro-Observations					
Adult-Focused Observation		2-3 hours of "core" program time, 1-2 adults		2-3 hours of "core" program time, 1-2 adults	
Child-Focused Observation			2-3 hours of "core" program time, 7 minutes per child, all children in class in sequence		2-3 hours of "core" program time, 7 minutes per child, all children in class in sequence
Classroom Snapshot	every 10 minutes, full program day	every 15 minutes as part of AFO observation	every 15 minutes as part of CFO observation	every 15 minutes as part of AFO observation	every 15 minutes as part of CFO observation

Kindergarten Classrooms Spring 1992		
Measure	**Day 1**	**Day 2**
Global Ratings		
ECERS	----------------->	completed based on 2 days of observation
Assessment Profile	not used in kindergarten	
Description of Preschool Practices	----------------->	completed based on 2 days of observation
Micro-Observations		
Adult-Focused Observation	2-3 hours of "core" program time, 1-2 adults	2-3 hours of "core" program time, 1-2 adults
Child-Focused Observation	not used in kindergarten	
Classroom Snapshot	every 10 minutes during 2-3 hours of "core" program time	every 10 minutes during 2-3 hours of "core" program time

Analytic Approach

The first substudy objective, to provide a description of Chapter 1-funded prekindergarten classrooms, called for descriptive analyses that examined a variety of teacher and child behaviors and classroom activities and groupings, three global ratings of classroom quality, and program and classroom characteristics typically associated with higher quality. These descriptive analyses parallel those found in the main study and provide a profile of school-based early childhood programs funded all or in part with Chapter 1 funds. The analyses also served to identify classroom characteristics and dynamics that varied little across the 55 Chapter 1-funded classrooms and were therefore excluded from further analyses related to the relationships between classroom environments and outcomes for children.

The second substudy objective—to explore relationships between selected classroom-level variables and child-level outcomes aggregated to the classroom-level—was addressed using simple correlation analyses. The specific hypothesized relationships that were analyzed are described in Chapter Four. Since the analyses were exploratory in nature, there was more concern for Type II than for Type I error, and p-values $\leq .10$ were considered admissible. The correlational findings can be viewed as interesting hypotheses for follow-up in more controlled research designs; the well-known cautions against imputing cause-effect relationships from correlations should be observed when considering these exploratory findings.

To address our third objective, exploring how the programmatic experience of children enrolled in Chapter 1-funded programs changes from prekindergarten to kindergarten, classroom-level data from these two environments were treated in two ways. In the first, a "cross-sectional" approach was taken using the classroom or teacher as the unit of analysis, and the characteristics of prekindergarten and kindergarten classrooms were compared as if they had been drawn from independent populations. In the second, a "within-subjects" approach was employed with the 131 sample children who were followed from 39 prekindergarten classrooms into 48 kindergarten classrooms. With two "waves" of classroom environment data available, we constructed a small glimpse into the child's experience of environmental discontinuity/continuity from prekindergarten to kindergarten. For the within-subjects flavor to be fully realized one would go on to ask, for example, what effects do such transitions have on children? But questions such as these were beyond the scope of the current study due to inadequate statistical power. This transition unit of analysis is described more fully as part of Chapter Five.

CHAPTER THREE

CHARACTERISTICS OF THE CHAPTER 1-FUNDED PREKINDERGARTEN CLASSROOMS

In this chapter we present and discuss selected characteristics of prekindergarten classrooms funded all or in part through Chapter 1 in order to portray the environments in which the children learn.[1] This is important for beginning to understand what early childhood education looks like in Chapter 1 programs. It also forms a context for discussing relationships between selected measures of classroom quality and child outcomes in Chapter Four and discussing the continuity/discontinuity of programmatic experience from prekindergarten to kindergarten in Chapter Five. Categories of characteristics that we present include staff qualifications, observed class sizes and child/adult ratios, parent involvement, activities and groupings during the classroom day, risk factors among children, classroom interactions, and more global measures of classroom quality.

Staff Qualifications

Staff in Chapter 1-funded prekindergartens were highly educated and trained (Exhibit 3.1). All teachers had at least a 4-year college degree: 58 percent had a bachelor's degree and 42 percent had a master's degree or higher. This finding was expected since licensure standards for public school teachers generally include at least a bachelor's degree. As might also be expected, assistants and aides had less formal education than did teachers, although only 8 percent had less than a high school diploma. Forty-five percent of the assistants and aides had some college; 18 percent had a bachelor's degree or higher.

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[1] It should be remembered that because data obtained in both the main study and the Chapter 1 substudy are limited to five sites, findings do not necessarily reflect a picture that is statistically representative of the entire country.

Exhibit 3.1
Percentages of Education Levels by Type of Staff

Educational Level	Type of Staff		All Staff (*N* = 106)
	Teachers (*N* = 55)	Assistants/Aides (*N* = 51)	
H.S. (no diploma)	0%	8%	4%
H.S. diploma	0	29	14
Some college	0	45	22
B.S./B.A.	58	16	38
M.A./Ph.D/Higher degree	42	2	23

Source: Teacher Interview

In addition to formal schooling, virtually all teachers were licensed and had received child-related training in the last year (Exhibit 3.2). Almost 90 percent of the teachers and 33 percent of the assistants/aides had their degrees in a child-related specialization. Licensure in early childhood education was very evident, with 71 percent of teachers holding a state early childhood education certificate or license and 87 percent a state elementary education certificate or license. Among the assistants/aides, a fair number (18 percent) held a state early childhood education certificate or license, and six percent an elementary license. Assistant teachers and aides were less likely than teachers to have received some type of child-related training in the last year.

Prekindergarten teachers and assistants/aides working in Chapter 1-funded prekindergartens were reasonably experienced, including multiple years of experience at their current positions (Exhibit 3.3). Teachers had taught early childhood education for an average of 9.6 years, assistants/aides 7.8 years, and both had taught about two-thirds of their time at their current programs. Both staff groups had an additional few years of grade school teaching experience—teachers averaged 3.4 years and assistants/aides averaged 2.8.

Exhibit 3.2
Percentages of Training and Licensure in Early Childhood by Type of Staff

Training and Certification	Type of Staff		
	Teachers (*N* = 55)	Assistants/Aides (*N* = 51)	All Staff (*N* = 106)
Early childhood training[1]	100%	78%	90%
Child-related specialization	89	33	62
Child development associate	7	6	7
State early childhood ed. license	71	18	45
State elementary ed. license	87	6	48
State secondary ed. license	18	6	12

[1] includes any and all early childhood training in the past year

Source: Teacher Interview

Exhibit 3.3
Years of Teaching Experience by Type of Staff

Teaching Experience	Mean Number of Years		
	Type of Staff		
	Teachers (*N* = 55)	Assistants/Aides (*N* = 51)	All Staff (*N* = 106)
Teaching early childhood	9.6	7.8	8.8
Teaching grade school	3.4	2.8	3.1
Teaching at current program	6.3	5.0	5.7

Source: Teacher Interview

Classroom Composition

The composition of Chapter 1-funded classes is shown in Exhibit 3.4. The average enrollment across all classrooms was a little over 19, though on any given day approximately 16 children were present.

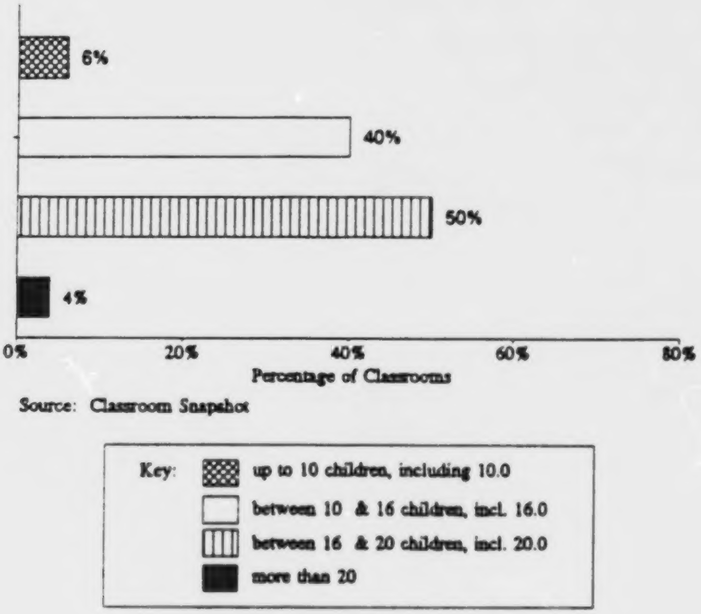
Exhibit 3.4
Average Numbers of Children and Adults, Child/Staff Ratio
(*N* = 55)

Number of:	Mean	(*SD*)
Children enrolled	19.1	(4.3)
Children present	16.0	(3.2)
Staff	1.9	(0.3)
Teachers	1.1	(0.2)
Assistants/Aides	0.8	(0.3)
Other adults (volunteers, parents)	0.4	(0.6)
Child/Staff ratio	9.3	(2.7)

Source: Classroom Snapshot

Although average enrollment in many Chapter 1-funded classrooms exceeded 16 to 20 children (the group sizes recommended by the National Association for the Education of Young Children—NAEYC), average observed group size exceeded 20 children in only 6 percent (three of the 55) of the classrooms (Exhibit 3.5) Moreover, average observed group size fluctuated widely across the day due to classrooms combining for activities (e.g., lunch, outdoor play, and arrivals or departures).

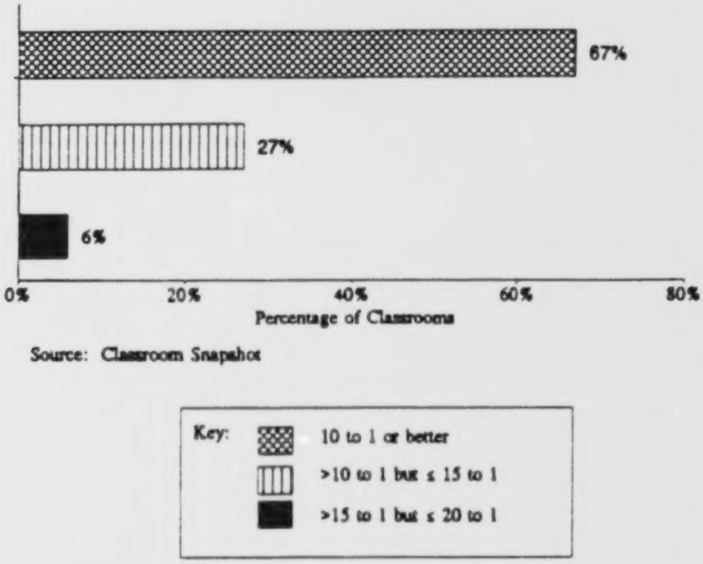
Exhibit 3.5
Distribution of Average Observed Group Sizes
(*N* = 55)



Source: Classroom Snapshot

Most, but not all, Chapter 1-funded classrooms had two staff members: one teacher and one assistant or aide. In only a few cases were there two teachers. Less than half of the classrooms had another adult, such as a parent volunteer, helping out. The resulting observed ratio averaged nine to ten children per adult, with 67 percent of the classrooms falling within the NAEYC guidelines for four-year-olds (10:1 for a group of 20) (Exhibit 3.6). Another 27 percent of the classrooms had observed ratios that on average did not exceed 15 children per adult; only six percent (three of the 55 classrooms) had ratios that exceeded 15:1.

Exhibit 3.6
Distribution of Average Observed Child/Staff Ratio
(*N* = 55)



Source: Classroom Snapshot

Parent Involvement

Involving parents in their children's education has been a Chapter 1 goal with increasing emphasis in recent years, particularly in early childhood programs. The extent of prekindergarten parent involvement in Chapter 1-funded school-based programs appears to reflect well on the strong federal mandate to involve parents in the education of their children.[2] Parent/teacher conferences represented the most frequent type of involvement reported by teachers, with over two-thirds of the classroom teachers reporting a majority of parents participating (Exhibit 3.7). A substantial percentage of classrooms had at least some parents involved in classroom activities (90 percent), going along on field trips (84 percent), attending social events (87 percent), making materials (78 percent), and sharing their skills (71 percent).

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[2] To be included in the sample, programs had to offer classroom-based services at least four days a week. Thus, programs designed primarily as home-based services or programs combining classroom-based and home-based services were excluded.

Exhibit 3.7
Percentages of Classrooms with Parent Involvement: Type of Involvement by Extent
(*N* = 55)

Type of Involvement	Extent of Involvement		
	Percentage None	Percentage Half or Less	Percentage More than Half
Volunteer in classroom	11%	75%	15%
Volunteer on field trips	16	56	27
Make materials	22	67	11
Share skills	29	67	4
Attend parent/teacher conferences	11	20	69
Attend social events	13	51	36
Recruit for the program	51	36	13

Source: Teacher Interview

The Classroom Day: Activities and Groupings

The majority (71 percent) of Chapter 1-funded prekindergarten classes were half-day—generally three hours long. A little over a quarter (27 percent) were extended-day, open for four to six hours; only one program was a full-day, eight hour, program (Exhibit 3.8). Looking at the pattern of activities and the grouping during the day we begin to get a basic picture of the typical Chapter 1-funded prekindergarten classroom.[3]

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[3] Various activities and groupings were computed as (1) the percentage of Snapshots in which a particular activity or grouping occurred, or (2) the percentage of the total number of activities or groupings accounted for by a particular activity observed with the Snapshot. In the current study, these variables were assumed to represent the ways in which classroom time was distributed among activities and groupings. A possible consequence of this assumption is the underestimation of short-duration events, such as a teacher's absence from the room.

Exhibit 3.8
Length of Classroom Day
($N = 55$)

Length	Number of Classrooms	Percentage of Sample
Half-day	39	71%
Extended-day (full school-day)	15	27
Full-day	1	2

Source: Director Interview

Activities

The typical Chapter 1-funded prekindergarten classroom day contained a wide variety of activities, most taking up a small portion of "core" program time (time excluding naps or whole class rest periods). The group of "routine" activities that included arrival, departure, lunch, and transitions between activities was the exception. These routines absorbed slightly over one-quarter of core time (Exhibit 3.9).

Activities that fostered expressive skills through arts and crafts occupied the next largest block of time (12 percent). Children spent approximately 11 percent of their time in activities related to math/language and science/natural world (for example, a counting song was defined as both a math/language activity; planting seeds or feeding fish were science/natural world activities); an additional 9 percent of time was spent with table games and puzzles. Dramatic/fantasy play and block construction, activities typically associated with higher-level peer social interaction, represented a smaller percentage of the typical classroom day than we expected (10 percent and 4 percent of the time, respectively).

Exhibit 3.9
Mean Percentages of Activities[1]
(*N* = 54)

Type of Activity	**Mean**	**(*SD*)**
Routines (arriving/departing/lunch/transition)	26%	(10)
Arts/Crafts	12	(6)
Dramatic/Fantasy play	10	(5)
Table games, puzzles	9	(6)
Math/Language	7	(8)
Active play	6	(6)
Listening to stories	5	(4)
Block construction	4	(5)
Group planning, discussion	4	(4)
Looking at pictures, picture books, slides	4	(4)
Sand/Water	4	(5)
Science, natural world	4	(7)
Music lesson, moving, dancing, listening	2	(3)
Sewing, cooking, woodwork	1	(3)
Watching TV, movies	1	(2)

[1] Base = total number of activities (excluding nap) observed

Source: Classroom Snapshot (one full program day)

This configuration of activities should not be interpreted as depicting a literal classroom day since the data are summarized across classrooms. Any one classroom on any given day may not incorporate all activities. Thus the true distribution of activities on a given day might include relatively higher percentages of time spent in relatively fewer activities. Looked at from another viewpoint, the distributions in Exhibit 3.9 mask a finding that some classrooms did not conduct specific activities that we would expect in the daily curriculum of an early childhood classroom. For example, in about a third or more of Chapter 1-funded classrooms data collectors saw no sewing, cooking, or woodworking; sand or water play; and/or activities involving moving, listening, or dancing to music during full-day observations (Exhibit 3.10). Looking across several days of observation modified this picture somewhat. In the course of a week, however, each of these activities occurred in almost all Chapter 1-funded classrooms at least once.

Exhibit 3.10
Percentage of Classrooms in Which Given Activity Occurred At Least Once
(*N* = 55)

Type of Activity	Percentage of Classrooms
Arts/Crafts	100%
Dramatic/Fantasy play	98
Table games, puzzles	98
Listening to stories	96
Active play	93
Block construction	85
Math/Language	85
Looking at pictures, picture books, slides	84
Science, natural world	84
Group planning, discussion	80
Music lesson, moving, dancing, listening	71
Sand/Water	56
Watching TV, movies	38
Sewing, cooking, woodwork	20

Source: Classroom Snapshot (one full program day)

Collapsing individual activities into composites of related activities provided another way of looking at the classrooms. We used the same composites presented in the main study, namely:

- goal-directed activities:[4] math/language; science/natural world; block construction; sewing, cooking, and woodworking; table games and puzzles; looking at books or pictures;
- art and music;
- exploration activities: sand or water play, dramatic and fantasy play;
- group activities: planning, discussion, lunch or snack, watching TV or movies;
- informal activities: active play (gross motor) and social interaction (conversation or "chatting"); and
- routines: arriving and departing, transitional activities.

Based on Jerome Bruner's concept of developmentally valuable activities, we see that in Chapter 1-funded classrooms one-third of children's time, or 20 minutes of every hour, was spent in goal-directed activities (Exhibit 3.11).

Exhibit 3.11
Mean Percentages of Types of Activities[1]
(*N* = 55)

Type of Activity	Mean	(*SD*)
Goal-directed activities	34%	(13)
Routines	20	(8)
Art and music	14	(6)
Exploration	13	(7)
Group activities	11	(6)
Informal activities	8	(6)

[1] Base = total number of activities (excluding nap) observed

Source: Classroom Snapshot (one full program day)

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[4] Suggested by Bruner (1980, p. 60) as follows: "The richest activities in terms of complete activity evoked almost invariably have two characteristics. In the first place, they have a clear *goal* and some *means* (not always obvious) available for its attainment. And secondly, they almost always have what for lack of a better name can be called 'real world feedback'—the child most often knows how he is doing . . . . These are the 'high-yield' activities. Somewhat behind them are play involving pretending, play with small-scale toys, and manipulating sand or dough. And well behind these come informal and impromptu games, gross motor play, and unstructured social playing about and 'horsing around.' These rarely lead to high level elaboration of play."

If we extend our view to include art, music, and exploration activities involving sand and water or dramatic and fantasy play, then approximately 60 percent of children's time was spent in activities likely to produce elaborated and concentrated play that promotes learning.

Groupings

A common concern among child developmentalists is that prekindergarten environments based in the public schools will begin to look more like elementary school classrooms, including mostly large group activities and instruction. The Chapter 1-funded prekindergarten classrooms did not appear to give this concern much support: only about one-quarter of observed grouping arrangements were large group activities (defined as seven or more children), as shown in Exhibit 3.12. Slightly over one-quarter of the time children worked individually, and nearly half the time they were engaged in small group activities (two to six children).

Exhibit 3.12
Mean Percentages of Children's Groupings[1]
(*N* = 54)

Type of Group	Mean	(*SD*)
One child	29%	(14)
Small group (2-6 children)	43	(13)
Large group (7+ children)	28	(16)

[1] Base = total number of groupings observed

Source: Classroom Snapshot (one full program day)

The size of groupings varied according to the type of activity taking place (Exhibit 3.13). For instance, goal-directed activities, exploratory activities, and art and music occurred most frequently in small groups. Almost no exploration activity occurred when children were in large groups. But, group sizes for "group activities," informal activities, and routines were almost always large.

Risk Factors and Stressful Classroom Events

In addition to the staffing and structural features of classrooms, characteristics of children and their families can influence the dynamics of classroom activity and quality. Almost all of the study children came from areas in which substantial numbers of children live close to or below the poverty level.[5] In addition to socioeconomic status, other aspects of children's backgrounds might pose challenges to teachers. Children may enter class speaking little or no English, have developmental delays (diagnosed or not) or be living apart from their natural parents. To investigate the extent of such problems in prekindergarten classrooms funded all or in part with Chapter 1 funds, teachers were asked to estimate the prevalence of these and other background characteristics in their classrooms.[6]

Overall, father's absence was the most prevalent of our risk factors. In 41 percent of the classes more than half of the children had absent fathers (Exhibit 3.14). Proportions of children with absent fathers were distributed fairly evenly across all study classrooms. The next most prevalent risk factor was the presence in the classroom of children whose first language was not English, although these children were heavily concentrated in only a few classes. The only other

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[5] Recall that districts having Chapter 1 prekindergarten classes in which less than 80 percent of the children were economically disadvantaged were considered as alternatives to be used only if districts meeting all our criteria declined to participate. In 14 of the 16 school districts, 80 percent or more of children in the Chapter 1-funded prekindergarten classrooms qualified for free or reduced-price lunch.

[6] Findings regarding estimated percentages of children in a class presenting risk factors are slightly higher than findings reported in Chapter Four where aggregate percentages were based on parents and teachers providing data for each sample child.

Exhibit 3.13
Mean Percentages of Types of Activities by Size of Group[1]

Type of Activity	Size of Group						N
	Large (7+ children)		Small (2-6 children)		Individual Child		
	Mean (%)	(*SD*)	Mean (%)	(*SD*)	Mean (%)	(*SD*)	*N*
Goal-directed activities (includes: math/language; science/natural world; sewing, woodworking, and cooking; block construction; table games and puzzles; looking at books)	28%	(19)	45%	(17)	27%	(18)	53
Art and music	18	(26)	58	(29)	24	(24)	53
Exploration (includes: sand/water play; dramatic/fantasy play)	3	(15)	66	(27)	31	(26)	51
Group activities (includes: planning/discussion; listening to stories; lunch or snack; watching TV, movies)	75	(31)	20	(30)	5	(14)	52
Informal activities (includes: active play; social interaction)	50	(40)	34	(34)	16	(24)	49
Routines (includes: arriving or departing; transitional activities)	45	(27)	20	(19)	35	(25)	54

[1] Base = total number of groupings for given type of activity observed

Source: Classroom Snapshot (one full program day)

Exhibit 3.14
Incidence of Child Risk Factors Across Chapter 1-Funded Classrooms
(*N* = 55)

Risk Factors	Percentage of Children in Classroom with Risk Factor									
	Between 0 and 9% of Children		Between 10 and 24% of Children		Between 25 and 49% of Children		Between 50 and 74% of Children		Between 75 and 100% of Children	
	Classrooms		Classrooms		Classrooms		Classrooms		Classrooms	
	#	%	#	%	#	%	#	%	#	%
First language not English	26	47%	10	18%	9	16%	5	9%	5	9%
Recent immigrant	45	82	4	7	5	9	1	2	0	0
Migrant family	55	100	0	0	0	0	0	0	0	0
Child living apart from birth mother	38	69	15	27	2	4	0	0	0	0
Physical handicap	54	98	1	2	0	0	0	0	0	0
Diagnosed developmental delay	47	86	5	9	1	2	0	0	2	4
Undiagnosed developmental problem	33	60	14	26	3	6	3	6	2	4
Substance-abusing parent(s)	36	66	13	24	5	9	0	0	1	2
Homeless	55	100	0	0	0	0	0	0	0	0
Father absent from home	9	16	11	20	13	24	14	26	8	15

Source: Teacher Interview

C8

C7

risk factors that were evident included diagnosed and undiagnosed developmental delays/problems, an estimated 14 and 10 percent of the total sample, respectively. When developmental problems were reported, they applied to few children in these classes.

Four activities measured by the Snapshot may be considered stressful classroom events and thus, at least conceptually, related to the risk factors above. These activities include children fighting, being disciplined, crying/in distress, or not involved in *any* activity.[7] As Exhibit 3.15 indicates, stressful events involving children were observed only a small proportion of the time. Children being disciplined occurred most frequently, averaging 14 percent of the time across classrooms. The standard deviations were large indicating that classrooms varied markedly in these aspects of child behavior.

Exhibit 3.15
Frequency of Occurrence of Negative/Stressful Events and Behaviors[1]
(*N* = 55)

Events/Behaviors	**Percentage of Time Observed**	
	Mean	**(*SD*)**
Children being disciplined	14%	(15)
Children not involved in activity	9	(7)
Children crying/in distress	6	(11)
Children fighting	6	(7)

[1] Base = number of Snapshots

Source: Classroom Snapshot (one full program day)

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[7] For each classroom and each event, we computed the proportion of observation time (based on one full program day) in which the behavior occurred. For example, the proportion of time in which any distress occurred was computed by determining the number of Snapshots that included these events divided by the total number of Snapshots for that classroom.

Classroom Interactions

We now focus more precisely on the interactions and behaviors of teachers and children that occur during the approximately two hours in the morning that is referred to as "core" program time, that is, after initial arrival and set-up routines are completed and before routines for disassembly or lunch begin. This period can include group or circle time and free play as well as the more organized activities in which most interactions would be expected to occur.[8]

Staff Interaction

Classroom staff were actively involved with children about 65 percent of the time (Exhibit 3.16). Teachers spent a much greater proportion of time interacting with children than did assistants/aides: 74 versus 55 percent.

Exhibit 3.16
Percentage of Staff Time in Interactions with Children by Type of Staff

Behavior	Type of Staff		All Staff (*N* = 104)
	Teachers (*N* = 55)	Assistant Teachers/Aides (*N* = 49)	
Interactions with children[1]			
Mean	74%	55%	65%
(*SD*)	(16)	(19)	(20)
Noninteractive behaviors[2]			
Mean	26	45	35
(*SD*)	(16)	(19)	(20)

[1] includes teaching/management, interactive participation, help/comfort, social interaction
[2] includes administration, attentive/observing, not involved, out of room

Source: Adult-Focused Observation

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[8] For the adult observations, one separate day was spent observing each adult. To examine the behavior and interactions of children, data collectors followed individual children and selected them at random until all had been observed. The sum of the two days of child observations were then computed to represent the behavior of the children as a group.

A more detailed portrayal of the nature of interactions was obtained by examining types of interactive and noninteractive behaviors (Exhibit 3.17). By far the largest percentage (49 percent) of staff time was spent in teaching and management: 33 percent in teaching and 16 percent in management of children's behavior. Relatively small proportions of time (4 to 6 percent) were spent casually conversing with children, helping or comforting them, and participating in their play or games. Staff were out of the room or otherwise not involved with children only 9 percent of the time. Staff spent the largest proportion of "noninteractive" time (19 percent) on administrative and transition activities. Almost 10 percent of time was spent quietly observing or attending to children.

Since the majority of teacher interactions concerned teaching and management behaviors, we examined the nature of interaction groupings, verbalizations, content, and techniques (Exhibit 3.18). The largest proportion of the teaching/management behavior of teachers (50 percent) was directed to the whole class; the remainder was distributed fairly evenly among large groups, small groups, and individual children. Looking at verbalizations, however, we see that 57 percent of them were directed at one child, indicating that a teacher may be interacting with the whole class or a large group, but directing comments or questions to individuals much of the time. Interestingly, teachers verbalized to groups almost twice as much as did assistants and aides.

Looking at the content of the teaching/management behavior, we see that preacademic areas (interactions related to language/reading and math/science) accounted for 44 percent of the interactions of teachers and 29 percent of the interactions of assistant teachers/aides. Interactions devoted to classroom organization represented another 25 percent of teaching/management behaviors of teachers and aides. The teaching/management interactive techniques used by staff were almost uniformly positive ones (explain, question, praise, sing), representing more than half of the techniques used by teachers or aides. The use of direct commands represented one of the most frequently used techniques (31 percent of the techniques used by teachers and 39 percent of

Exhibit 3.17
Types and Frequency of Interactions Between Adults and Children by Type of Staff

Behavior	Mean Percentage of Staff Time		
	Teachers (*N* = 55)	**Assistant Teachers (*N* = 49)**	**All Staff (*N* = 104)**
Interactive			
Teaching			
Mean	39%	26%	33%
(*SD*)	(16)	(17)	(18)
Management			
Mean	19	12	16
(*SD*)	(12)	(9)	(11)
Playing with children			
Mean	6	6	6
(*SD*)	(5)	(6)	(6)
Help/comfort			
Mean	4	5	4
(*SD*)	(4)	(5)	(5)
Casual conversation			
Mean	6	6	6
(*SD*)	(6)	(5)	(6)
Noninteractive			
Administration			
Mean	16	23	19
(*SD*)	(13)	(16)	(15)
Attentive observing			
Mean	5	13	9
(*SD*)	(5)	(8)	(8)
Not involved			
Mean	2	4	3
(*SD*)	(3)	(7)	(5)
Out of room			
Mean	3	6	5
(*SD*)	(5)	(6)	(6)

Source: Adult-Focused Observation

Exhibit 3.18
Characteristics of Teaching/Management Behavior: Percentage by Type of Staff[1]

Teaching/Management Behavior Characteristic	Type of Staff					
	Teachers (*N* = 55)		Asst. Teachers/Aides (*N* = 49)		All Staff (*N* = 104)	
	Mean	(*SD*)	Mean	(*SD*)	Mean	(*SD*)
No. of Children in Interaction						
One child	13%	(13)	21%	(21)	17%	(18)
Small group	18	(13)	24	(20)	21	(17)
Large group	20	(18)	27	(24)	23	(21)
Whole class	50	(22)	28	(28)	39	(27)
Verbalization by Staff						
To one child	57%	(15)	73%	(17)	65%	(18)
To group	42	(15)	24	(16)	33	(18)
None	1	(2)	2	(4)	2	(3)
Content of Teaching/ Management						
Language/Reading	29%	(16)	19%	(20)	24%	(18)
Classroom organization	24	(15)	25	(19)	24	(17)
Math/Science	15	(17)	10	(17)	13	(17)
Expressive/ Artistic skills	11	(9)	20	(25)	15	(19)
Social rules	10	(9)	13	(10)	11	(9)
Developmental/ Self-help skills	8	(9)	9	(11)	8	(10)
Games with rules	3	(4)	5	(11)	4	(9)
Techniques						
Command	31%	(17)	39%	(21)	35%	(19)
Explain	31	(14)	30	(19)	30	(16)
Question	20	(10)	15	(10)	18	(10)
Praise	11	(7)	11	(11)	11	(9)
Sing	5	(5)	2	(3)	3	(5)
Divert	1	(2)	1	(2)	1	(2)
Restrain/Remove	1	(2)	1	(2)	1	(2)
Threaten	1	(2)	1	(2)	1	(2)
Punish physically	0	(1)	1	(3)	1	(2)

[1] Base = all teaching/management occurrences

Source: Adult-Focused Observation

techniques used by aides). Negative techniques, such as physical punishment, threatening, restraining, and diverting, were each used only about 1 percent of the time.

Child Interaction

Turning to interaction from the perspective of children, we see that they spent over half (53 percent) of their time *not* interacting, spending that time either alone or in a teacher-led group (Exhibit 3.19). Most interactions involved peers or peers and adults (38 percent); less than 10 percent of social interaction involved interactions between an individual child and an adult. Interactive behavior among peers also tended to occur among pairs or small groups of children (two to four children) rather than among larger groups or the whole class (Exhibit 3.20).

Exhibit 3.19
Percentage of Time Children Spend in Social Interaction
(*N* = 55)

Type of Interaction	Mean	(*SD*)
No interaction: group time	30%	(13)
Interaction with peers	28	(12)
No interaction: child alone	23	(9)
Interaction with peers and adults	10	(13)
Interaction with adults	8	(5)

Source: Child-Focused Observation (time sample)

Exhibit 3.20
Percentage of Interactive Behavior by Size of Group
(*N* = 55)

Group Size	Mean	(*SD*)
One other child	21%	(13)
2-4 children	38	(14)
5 or more children	14	(13)
Whole class	20	(15)

Source: Child-Focused Observation (interaction sample)

Interactions between children and peers or adults occurred more often in some contexts than in others. When engaged in exploratory activities, such as sand or water play and dramatic/fantasy play, children were more likely to interact with peers (Exhibit 3.21). In contrast, goal-directed activities tended to involve interactions with an adult.

Quality in Chapter 1-Funded Prekindergarten Classrooms

The overall quality of the classroom environment was measured with three instruments that rate particular aspects of the environment, including: physical space, equipment, materials, health and safety practices, curriculum, scheduling and teacher behavior. The three instruments were the Early Childhood Environment Rating Scale (ECERS), the Assessment Profile for Early Childhood Programs (Assessment Profile), and the Description of Preschool Practices (DPP). The teacher's emotional tone in her interactions with children was assessed by a fourth instrument, the Arnett Global Caregiver Rating Scale (Arnett).[9] Looking across these measures, Chapter 1 prekindergarten classrooms in this sample were rated as having acceptable-to-good, though not excellent, levels of quality.

The overall average score on the ECERS was 4.7, where a 3-rating is defined as "minimal," a 5 as "good," and a 7 as "excellent" (Exhibit 3.22a). Each of the seven ECERS subscales was rated quite close to that overall average, with social development the lowest at 4.0 and adult needs and language/reasoning experiences higher at 5.3 and 5.2, respectively. Looking at the distributions of classroom total scores (Exhibit 3.22b), we see that 29 percent were rated "good" in quality and an additional 5 percent good to excellent in quality. Although few classrooms had overall ECERS scores in the "minimal" range (a score less than 4.0), almost half (47 percent) of the classrooms were just minimally adequate on the social development subscale.

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[9] Scoring procedures and reliability estimates for each of these instruments are included in *Volume I: Life in Preschool: An Observational Study of Early Childhood Programs for Disadvantaged Four-Year-Olds.*

Exhibit 3.21
Focus of Children's Interactions in Three Types of Activities
(*N* = 55)

Type of Activity	**Type of Interaction**					
	Interaction with Peers		**Interaction with Adults**		**Interaction with Peers and Adults**	
	Mean	**(*SD*)**	**Mean**	**(*SD*)**	**Mean**	**(*SD*)**
Goal-directed activities (includes: math/language; science/natural world; sewing; woodwork; cooking; block construction; table games; puzzles; looking at books)	31%	(16)	42%	(22)	28%	(17)
Art and music	28	(21)	38	(23)	35	(23)
Exploration (includes: sand/water play; dramatic/fantasy play)	50	(26)	16	(21)	34	(26)

Source: Child-Focused Observation (time sample)

Exhibit 3.22a
Mean Scores and Standard Deviations on the Early Childhood Environment Rating Scale (ECERS)
(*N* = 55)

ECERS Scores[1]	Mean	(*SD*)	*N*
ECERS average score	4.7	(.7)	55
Subscales			
Personal Care	4.7	(1.1)	55
Furnishings	4.6	(.9)	55
Language	5.2	(1.1)	55
Motor	4.6	(1.1)	54
Creative	4.6	(1.0)	53
Social Development	4.0	(.9)	55
Adult Needs	5.3	(.9)	53

[1] 1 = inadequate 3 = minimal 5 = good 7 = excellent

Exhibit 3.22b
Distribution of Average Scores on the Early Childhood Environment Rating Scale (ECERS)
(*N* = 55)

	Percentage of Classrooms with Scores in Range:					
ECERS Scores[1]	1.0–1.9	2.0–2.9	3.0–3.9	4.0–4.9	5.0–5.9	6.0–7.0
ECERS average score	0%	0%	13%	53%	29%	5%
Subscales						
Personal Care	0%	7%	15%	29%	35%	15%
Furnishings	0	4	24	36	29	7
Language	0	0	11	29	35	25
Motor	2	4	19	35	33	7
Creative	0	4	19	47	19	11
Social Development	0	9	38	42	9	2
Adult Needs	0	0	6	30	34	30

[1] 1 = inadequate 3 = minimal 5 = good 7 = excellent

The mean total score on the Assessment Profile indicates that Chapter 1-funded classes were of barely acceptable quality in a number of areas related to safety and health, the learning environment, scheduling, curriculum, interacting, and individualizing. The average total score of 106 out of a possible 147 indicates that the average program received affirmative ratings on 72 percent of the scale items (Exhibit 3.23a).[10]

Exhibit 3.23a
Mean Scores and Standard Deviations on the
Assessment Profile for Early Childhood Programs
(*N* = 55)

Profile Scores	Mean	(*SD*)
Total score (max. = 147)	106.3	(13.9)
Subscales		
Schedule (max. = 23)	18.0	(3.2)
Learning Environment (max. = 18)	11.9	(3.2)
Safety and Health (max. = 24)	17.4	(2.8)
Curriculum (max. = 28)	18.3	(4.8)
Interacting (max. = 32)	25.7	(4.3)
Individualizing (max. = 22)	15.1	(4.2)

Looking at each subscale score (Exhibit 3.23b), we see that interacting, scheduling, and safety and health were at or above acceptable levels, whereas learning environment, curriculum, and individualizing were slightly below that level. When the distribution of classrooms total scores is examined (Exhibit 3.23c), we see that a strong majority of classrooms' ratings were just below the acceptable level, and almost 40 percent above acceptable; no classrooms' totals fell at the lower rating levels (though subscore ratings did for a few classrooms).

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[10] At present, there are no criteria for high quality on the Profile, but discussion with the instrument's developers suggested an informal criterion of 75 percent for acceptable quality.

Exhibit 3.23b

Mean Scores on the Assessment Profile for Early Childhood Programs as Percentage of Maximum Score

(*N* = 55)

Profile Scores	Percentage of Maximum
Total score	72%
Subscales	
Schedule	78
Learning Environment	66
Safety and Health	73
Curriculum	65
Interacting	80
Individualizing	69

Exhibit 3.23c

Distribution of Total Scores on the Assessment Profile for Early Childhood Programs

(*N* = 55)

Profile Scores	Percentage of Programs with Scores in Range:			
	0–25% of Maximum	26–50% of Maximum	51–75% of Maximum	76–100% of Maximum
Total score	0%	0%	62%	38%
Subscales				
Schedule	0	4	29	67
Learning Environment	4	15	44	38
Safety and Health	0	5	60	35
Curriculum	4	15	60	22
Interacting	0	5	25	69
Individualizing	4	20	35	42

Average item scores on the DPP ranged from 1 to 5 (1 = not at all like this classroom, 3 = somewhat like this classroom, and 5 = very much like this classroom) indicating the occurrence of events that are considered developmentally appropriate or developmentally inappropriate according to NAEYC criteria. Chapter 1-funded classrooms typically followed developmentally appropriate practices "somewhat," though not "very much" (Exhibit 3.24a and Exhibit 3.24b). Consistent with this, classrooms averaged below 3 on the inappropriate practices subscale, meaning that teachers used inappropriate practices "not at all" to "somewhat." Seen another way, only one in five classrooms (19 percent) characteristically used inappropriate practices, which include: larger group instruction, teacher-direction rather than self-direction of children's schedule and activities, and children routinely copying teacher-made forms or models.

Exhibit 3.24a
Mean Scores and Standard Deviations on the Description of Preschool Practices (DPP)
(*N* = 55)

DPP Subscale[1]	**All Programs**	
	Mean	**(*SD*)**
Developmentally Appropriate	3.6	(.8)
Developmentally Inappropriate	2.4	(.8)

[1] 1 = not at all 3 = somewhat 5 = very much like this classroom

Exhibit 3.24b
Distribution of Average Scores on the Description of Preschool Practices
(*N* = 55)

DPP Subscale[1]	**Percentage of Classrooms with Scores in Range:**			
	1.0–1.9	**2.0–2.9**	**3.0–3.9**	**4.0–5.0**
Developmentally Appropriate	2%	24%	35%	40%
Developmentally Inappropriate	40	42	15	4

[1] 1 = not at all 3 = somewhat 5 = very much like this classroom

Finally, teachers were rated quite high in terms of warmth and responsiveness to children (on average 3.4 out of a possible 4) on the Arnett, while aides averaged 3.0 (Exhibits 3.25a and 3.25b). Both teachers and aides were rated very low on harsh and negative behaviors, averaging 1.3 and 1.5 out of 4.0, respectively. The distributions of Arnett ratings for teachers and aides tell a similar story (Exhibits 3.26a and 3.26b).

Exhibit 3.25a
Mean Scores and Standard Deviations on the
Arnett Global Caregiver Rating Subscales: Teachers
(*N* = 55)

Arnett Subscales[1]	**Mean**	**(*SD*)**
Warmth/Responsiveness	3.4	(.7)
Harshness	1.3	(.4)

[1] 1 = not at all 2 = somewhat 3 = quite a bit 4 = very much

Exhibit 3.25b
Mean Scores and Standard Deviations on the
Arnett Global Caregiver Rating Scale Subscales: Assistant Teachers and Aides
(*N* = 51)

Arnett Subscales[1]	**All Assistants/Aides**		
	Mean	**(*SD*)**	***N***
Warmth/Responsiveness	3.0	(.7)	8
Harshness	1.5	(.6)	49

[1] 1 = not at all 2 = somewhat 3 = quite a bit 4 = very much

Exhibit 3.26a
Distribution of Subscore Averages on the Arnett Global Caregiver Rating Scale: Teachers
(*N* = 55)

Arnett Subscales[1]	Percentage of Teachers with Scores in Range:			
	1.0—1.5	1.6—2.5	2.6—3.5	3.6—4.0
Warmth/Responsiveness	2%	11%	31%	56%
Harshness	82	16	2	0

[1] 1 = not at all 2 = somewhat 3 = quite a bit 4 = very much

Exhibit 3.26b
Distribution of Subscore Averages on the Arnett Global Caregiver Rating Scale Subscales: Assistant Teachers and Aides
(*N* = 51)

Arnett Subscales[1]	Percentage of Assistants/Aides with Scores in Range:			
	1.0—1.5	1.6—2.5	2.6—3.5	3.6—4.0
Warmth/Responsiveness	2%	17%	58%	23%
Harshness	69	18	12	0

1 1 = not at all 2 = somewhat 3 = quite a bit 4 = very much

Intercorrelations Among Selected Classroom Characteristics and Processes

One of the main questions of the Chapter 1 substudy concerned the relationship between classroom characteristics and processes (including global classroom quality), and child outcomes. We examined a large set of predictors that (1) previous research showed were related to cognitive and social-emotional outcomes, and (2) the main study found were consistently and significantly associated with variations in quality. They include:

- **Classroom Structure**

  - Child/Staff ratio

- **Measures of Global Quality**

  - ECERS average score
  - DPP: Average score for Appropriate Practices
  - DPP: Average score for Inappropriate Practices
  - Arnett Global Rating Scale: Warmth/Responsiveness

- **Teacher Interaction with Children**

  - Percentage of time teacher spends in teaching/management (a composite of teaching and management behaviors)
  - Percentage of time teacher spends teaching
  - Percentage of teaching focused on cognitive concepts
  - Percentage of positive teaching techniques
  - Percentage of children with no one-to-one interaction with adult

- **Classroom Activities and Groupings**

  - Percentage of goal-directed activities (a composite of math/language; science/natural world; sewing, woodworking, and cooking; block construction; table games and puzzles; looking at books)
  - Percentage of math/language-related activities
  - Percentage of activities involving block construction
  - Percentage of sand/water play
  - Percentage of dramatic/fantasy play
  - Percentage of time class is organized in small groupings only
  - Percentage of time class is organized in whole class grouping

Three key variables typically associated with classroom quality (group size, teacher education, and level of parent involvement) were not included due to lack of variation among Chapter 1-funded classrooms in these areas.

In order to assess the degree to which "good things go together" in these Chapter 1-funded classrooms, we examined relationships among the above classroom quality indicators (Exhibit 3.27). The literature on classroom quality has revealed that the ratio of children to adults is an important predictor of overall program quality (Ruopp, Travers, Glantz, & Coelen, 1979; Whitebook, Howes, & Phillips, 1990). As would be expected, higher child/staff ratios in

Exhibit 3.27
Significant Relationships Among Measures of Classroom Environments and Processes

Variable	Structure	Global Quality				Teacher Interaction					Classroom Activities					Classroom Groupings	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Structure																	
1. Ratio of children to adults																	
Global Quality																	
2. ECERS																	
3. DPP: Developmentally Appropriate		.64***															
4. DPP: Developmentally Inappropriate		-.50***	-.56***														
5. Arnett: Warmth/Responsiveness		.38**	.58***														
Teacher Interactions																	
6. Time in teaching/management[1]			.42**		.37**												
7. Time in teaching					.49***												
8. Time focussed on cognitive concepts				.31*		.69***	.40**										
9. Positive techniques		.30*			.46***		.49***	.35*									
10. Children with no one-to-one	.35*	-.39**															
						-.35*											
Classroom Activities																	
11. Goal-directed activities[2]				.37**	.29*	.36**	.40**	.33*				-.30*					
12. Math/Language-related activities				.46***				.40**			.63***						
13. Block construction																	
14. Sand/Water play	-.31*										-.38**						
15. Dramatic/Fantasy play			.28*	-.41**								-.45**					
Classroom Groupings																	
17. Time class in small groups only	-.43**													.37**			
18. Time in whole class grouping	.43**																
																.57***	

[1] a composite variable that includes teaching and management behaviors

[2] a composite variable that includes math/language-related activities; science/natural world; block construction; sewing, cooking and woodworking; table games and puzzles; looking at books or pictures

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

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Chapter 1-funded classrooms were negatively related to the time that children spent in individual activities or in small groups and positively related to children having no one-to-one interaction with teachers and the amount of time classrooms were organized as whole groups. Time spent in activities such as sand/water and dramatic/fantasy play was also associated with lower child/staff ratios. The lack of relationship between ratio and teacher interactions, classroom activities, and global ratings of classroom quality may be due to the relatively narrow range of average child to staff ratios that were observed across classrooms.

Our observations of classroom characteristics/processes and ratings of global classroom quality tended to be consistent. The global measures of classroom quality, in particular, were all highly intercorrelated with each other. Teachers in classrooms with higher ECERS scores also used more positive techniques and there was more one-to-one interaction between children and adults. Warmer, more responsive teachers spent more time in teaching/management. The warmth and responsiveness of teachers was also positively associated with their use of positive teaching techniques and more goal-directed classroom activities (but not math/language-related activities—a subset of goal-directed activities). Developmental appropriateness ratings were also positively associated with teacher warmth and responsiveness.

Classroom ratings of developmental inappropriateness were positively related to the time teachers focused on teaching cognitive concepts, and the time children spent in goal-directed classroom activities, particularly math-language-related activities. As we might expect, time that teachers spent focused on cognitive concepts was associated with time spent in "teaching," and goal-directed activities. Less time was spent in sand/water play and dramatic/fantasy play in classrooms rated more developmentally inappropriate; time spent in dramatic/fantasy play was positively associated with ratings of developmental appropriateness. While goal-directed activities and activities involving block construction were not associated with particular classroom grouping arrangements, math/language-related activities were associated with small-group arrangements. Sand/water play was related to time spent by children in small groups.

Comparison With The Main Study Sample

We compared our sample of 55 Chapter 1-funded prekindergarten classrooms with the main study sample (119 Head Start, community-based, and school-based preschool settings serving 4-year old children). Overall, characteristics of the Chapter 1 substudy and main study samples were very similar, including background characteristics of enrolled children in terms of risk factor percentages such as children whose first language was not English, absent father, developmental delay, and substance-abusing parent. The major differences included: Chapter 1-funded classrooms were less likely than community-based child-care centers to operate full-day programs; staff in Chapter 1-funded classrooms had higher levels of formal education and were more likely to have previous elementary school teaching experience (although their aides and assistants were less likely to have had child-related training in the past year) than other types of programs; Chapter 1-funded classes had higher levels of parent involvement than other types of programs, except for the Head Start classrooms (which had higher levels of parent involvement than did Chapter 1); and more time in Chapter 1-funded classrooms was spent on activities involving reading/language and math/natural world.

Chapter 1-funded classrooms had fewer assistants/aides or volunteers (resulting in slightly higher child/staff ratios on average than in Head Start classrooms). Furthermore, the average observed ratio in Chapter 1-funded classrooms (9.3 children per adult) was slightly higher than that found by Whitebook, Howes, and Phillips (1990) in their five-site study of both for-profit and nonprofit classrooms serving three- to five-year-olds (averaging 8.4 preschoolers per adult).

The overall level of classroom quality was assessed in terms of developmental appropriateness (according to NAEYC guidelines); standards of safety and health, scheduling, curriculum, interaction, and individualization; and the emotional tone of the teacher. In general, the Chapter 1-funded classrooms were of acceptable to good quality, with ratings very similar to those of the main study sample classrooms. Again, the only significant differences were between the Chapter 1-funded classrooms and community-based child-care centers, with the Chapter 1-funded classrooms tending to have higher average quality ratings.

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CHAPTER FOUR

LINKS BETWEEN CHILD OUTCOMES AND SELECTED CLASSROOM-LEVEL CHARACTERISTICS AND PROCESSES

In the preceding chapter we described the characteristics of Chapter 1-funded prekindergarten classrooms and characterized the classroom environment in terms of global quality. One of the main research questions of the Chapter 1 substudy concerned the relationship of classroom quality to cognitive and social-emotional outcomes for enrolled children. To provide a context for discussing these relationships, we begin this chapter by summarizing the background characteristics of sample children and their families and our findings related to the children's cognitive and social-emotional development. We then outline hypothesized relationships between selected classroom-level characteristics and these child outcomes. Finally, we present results from our analyses of these relationships. The primary intention of this chapter is to describe relationships, not to draw implications for policy, which is the focus of Chapter Six.

Background Characteristics of Sample Children and Their Families

In general, background characteristics of children and families appeared consistent across the five sites with some variation across the 16 participating school districts (Exhibits 4.1 and 4.2 summarize the overall characteristics of children and families; findings by site and participating school districts are reported in *Volume III: Technical Appendices)*.[1] Slightly more than half of the sample children were girls. Eighty-five percent were racial or ethnic minorities. Most

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[1] These data are not necessarily representative of Chapter 1-eligible children enrolled in Chapter 1-funded prekindergarten programs for two reasons. First, since the Chapter 1 substudy did not randomly sample Chapter 1 prekindergarten-funded classrooms, findings might not generalize to the population of Chapter 1 programs located across the United States. Second, children were eligible for participation in the Chapter 1 substudy if they were simply enrolled in a class funded all or in part with Chapter 1 funds. Since some school districts use Chapter 1 funds to expand on other funding sources for early childhood programs (e.g., Head Start, state funds targeted for children from economically disadvantaged families, and programs for children with developmental disabilities), sample classrooms may enroll children whose "slots" are funded by a variety of sources. Thus, all sample children did not necessarily qualify for program enrollment under Chapter 1.

Exhibit 4.1
Demographic Background Characteristics of Children

Background Characteristic	Percent of Sample
Gender	
Female	52%
Ethnicity	
African-American	48%
Hispanic	31
White	15
Other	7
Language Preference as of Fall 1990	
English	89%
Spanish	7
Mix of English/Spanish	4
Prior Preschool Experience	
None	15%
Data not available	36
Primary Language Spoken at Home	
Mostly English	77%
Mostly Spanish	8
Mixed English/Spanish	10
Other	5
Eligibility for Free or Reduced-Price Lunch	
Eligible	78%
Data not available	14
Absenteeism Since Beginning of School Year	9%
Reside Apart From Birth Mother (>1 Month)	9%
Evidence of Conditions that Limit/prevent:	
Regular school attendance	6%
Participation in all classroom activities	5
Usual childhood activities	4
Evidence of Conditions that Require:	
Frequent medical attention or treatment	6%
Regular use of medicine or drugs	2
Use of special equipment	1
Evidence of Need for Help Due to Behavioral, Emotional, Mental Problem	12%

Source: About Your Family; Child Background Information forms; review of student records

Exhibit 4.2
Family Background Characteristics

Background Characteristic	Percent of Sample
Marital Status	
Married	50%
Education of Father	
Grade 11 or less	22%
Grade 12 or GED	44
At least some college	27
Unknown	7
Education of Mother	
Grade 11 or less	22%
Grade 12 or GED	41
At least some college	35
Unknown	1
Mother's Age at Birth of First Child	
13 to 15	5%
16 to 18	24
19 to 21	34
22 or older	35
Primary Language Spoken at Home	
Mostly English	77%
Mostly Spanish	8
Mixed English/Spanish	10
Other	5
Expectation for How Well Child Will Do in School	
Excellent	34%
Well	50
About average	12
Very poorly	<1
Do not know	4
Expectation for How Far Child Will Go in School	
Grade 8	<1%
High School	8
Job Training	8
College	73
Do not know	12
Evidence Family Needed Help Due to Substance Abuse, Economic Problems, Emotional or Mental Problems	14%

Source: About Your Family

children were assessed in English; children who were assessed in Spanish were located primarily in California and Texas and in certain districts and classes within these sites. Across the sample, children were similar in age, in eligibility for free or reduced-price lunch, and in school attendance. As of spring 1991, teachers reported that approximately 14 percent of the *families* of sample children needed help due to substance abuse; economic problems; or behavioral, emotional or mental problems. Teachers indicated that 12 percent of the sample *children* needed help for a behavioral, emotional, or mental problem and that 9 percent had resided with someone other than their natural mother for more than one month since school had started. Only small percentages of sample children were reported by teachers to have physical, emotional, or mental conditions that limited or prevented regular school attendance (6 percent); to have conditions that limited or prevented participation in all school activities (5 percent); to use medicine other than vitamins (2 percent); or to require the use of any special equipment (less than 1 percent).

The level of parent education was quite high: 35 percent of the mothers of sample children and 27 percent of the fathers had at least some college experience; approximately 22 percent of the mothers and fathers had completed less than twelfth grade. Our sample did not include a preponderance of "teen mothers" (approximately one quarter of the mothers were 16 to 18 years of age when they gave birth to their first child and only 5 percent were younger than 16) although only about half of the parents were currently married. Teachers reported that English was the primary language spoken at home by over three-quarters of the mothers (or primary caregivers) of sample children, 13 percent spoke mostly Spanish or some other language, and 10 percent spoke a mix of Spanish and English.

Almost all parents expected their children to perform "well" or "excellent" in school. Over 70 percent of the parents expected their children to attend college. Parental expectations that their child would attend college varied according to the background characteristics of families.

Specifically, parents were *less* likely to expect their child to attend college if

- **their own educational attainment was below grade 12 than if parents had at least some college (mother's education: chi-square (2) = 68.62, $p \leq .0001$) (father's education: chi-square (2) = 58.18, $p \leq .0001$);**
- **the child's mother was 18 years of age or younger when she had her first child than if the mother was older (chi-square (1) = 23.07, $p \leq .0001$); and**
- **the primary language spoken at home was Spanish or a mix of Spanish and English than if English was spoken (chi-square (3) = 17.54, $p \leq .001$).**

A Child and Family Risk Composite

We hypothesized that although the effect of any one background variable may be negligible, the cumulative effect of a number of them might create stress and thus ever greater risk for adversely influencing the cognitive and social-emotional outcomes of children (Hauser-Cram, Pierson, Walker, & Tivnan, 1991). In their influential book, *Within Our Reach*, Schorr and Schorr (1988) noted that "it takes more than a single risk factor to elicit an adverse outcome" (p. 25). They built their argument, in part, on the work of Michael Rutter who found that "when two or more stressors occurred together, the chance of a damaging outcome went up at least fourfold, and when four factors were present, the risk increased tenfold" (Schorr & Schorr, 1988, p. 28).

To analyze the cumulative effects of child and family background risks on child outcomes, we constructed a risk composite variable of nine child and family background variables. The nine variables included in the composite and the criterion for risk on each are listed in Exhibit 4.3. Although we were not able to collect data on some of the more potent risk factors examined by Schorr and Schorr or by Rutter (such as low birth weight, substance abuse, or child abuse), we wanted to examine whether the cumulative effect of variables that we did measure would predict children's performance.

Exhibit 4.3
Risk Composite Variable

Risk Variable Components	Risk Criteria	Percent Meeting Criteria
Language spoken at home	Home language not English	23%
Participation in school activities is limited due to physical, emotional, or mental conditions	"Yes" response to questionnaire regarding any physical, emotional, or mental condition that affects school participation	7
Special educational requirements due to any physical, emotional, or mental condition	"Yes" response to questionnaire regarding any physical, emotional, or mental condition that requires special education	6
Child needs help for behavioral, emotional, or mental problem	"Yes" response to teacher questionnaire regarding child needs	12
Child's family needs help due to substance abuse, economic, or behavior problems	"Yes" response to teacher questionnaire regarding child's family needs	14
Child's residence during school year	Lived without mother for more than one month since start of school year	9
Mother's age at first childbirth	Mother's age at first childbirth was less than 18	18
Mother's educational level	Mother's educational level is less than 12th grade	22
Father's educational level	Father's educational level is less than 12th grade	21

The criterion for each risk variable component was based on our analysis of the fall 1990 family background data and on analyses of the distributions of background data collected during spring 1991. Children were given one risk point if an aspect of their background met the established risk criterion for that variable. Thus, each sample child received a composite risk score that could vary from 0 to 9.

Of 677 sample children, 36 percent scored zero; 26 percent scored 1; 19 percent scored 2; 12 percent scored 3; and 7 percent scored 4 or more (Exhibit 4.4). The mean score was 1.3, suggesting relatively low levels of risk among sample children.

Exhibit 4.4
Composite Risk Scores of Sample Children
(N = 677)

Site	Composite Risk Score							
	0		1		2		3	
	Count	Count Percent	Count	Count Percent	Count	Count Percent	Count	Count Percent
California	25	25%	28	28%	22	22%	19	19%
Florida	35	28	31	25	31	25	18	15
Texas	45	25	47	26	42	23	27	15
New Jersey	73	59	23	19	15	12	7	6
Michigan	62	42	49	33	25	14	12	8
Total	240	36%	194	26%	131	19%	83	12%

(Continued)

Site	Composite Risk Score					
	4		5		6 or more	
	Count	Count Percent	Count	Count Percent	Count	Count Percent
California	6	6%	2	2%	0	2%
Florida	6	5	3	2	0	2
Texas	7	4	10	6	2	6
New Jersey	3	2	2	2	0	2
Michigan	4	3	0	0	0	0
Total	26	4%	17	3%	2	3%

Sources: About Your Family Form, Child Background Form, Child Information Form

Child Outcomes

Based on theoretical notions of assessing children's cognitive achievement and social-emotional functioning (see Appendix C) and on empirical analyses of teacher ratings for a sample of 783 Chapter 1 preschool children at the fall 1990 pretest, we conceptualized child outcomes in terms of three specific outcome domains: cognitive achievement, mastery task competence, and social-emotional functioning.[2]

We measured outcomes using the Preschool Inventory (PSI) and the Child Behavior Rating Scale (CBRS) at the fall 1990 pretest and then again at the spring 1991 posttest. The PSI and CBRS provided child outcome data using two distinct measurement modes: direct assessment and teacher ratings, respectively.[3] In spring 1991, we added behavioral observations as a third measurement mode. Using observational categories provided by the Bronson Social and Task Skills Profile (Bronson, 1990), we recorded child behavior in terms of social and mastery task competence.

Fall to Spring Comparisons

PSI scores for cognitive achievement and CBRS teacher ratings for mastery task and social emotional functioning were consistent across sites and districts: PSI mean scores changed from 15.5 in the fall to 20.3 in the spring of the prekindergarten year, an average increase of 4.8 points or .84 PSI points per month (Exhibit 4.5). This gain in cognitive achievement was approximately

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[2] Analyses related to the definition of each of these domains are included in *Volume III: Technical Appendices.*

[3] The attrition of children from fall 1990 to spring 1991 and the number of children with incomplete PSI data were slightly higher than our projections (we had estimated 10 percent). In order to determine if we had differential attrition, we compared selected characteristics of the initial sample of children to those who remained in the sample as of spring 1991 and spring 1992. The groups were not significantly different in terms of entering cognitive achievement or child and family background characteristics.

Exhibit 4.5
Relations Between Fall to Spring Child Outcomes
(*N* = 677)

Child Outcome	**Fall 1990 Mean Scores**	**Spring 1991 Mean Scores**	**Mean Change Score[1]**	**Pearson *r* (Fall—Spring)**
Cognitive Achievement (PSI)	15.5	20.3	+4.8**	.73
CBRS	3.6	3.8	+.2**	.35

$^{*}p \leq .05$ $\quad$ $^{**}p \leq .01$

[1] note: mean change score does not necessarily equal the difference between mean scores

double that expected by maturation alone and quite similar to the average gain shown by children participating in Even Start (who averaged .86 PSI points per month) (RMC Research Corporation, 1993).[4] The relationship between the fall and spring PSI scores was strong (*r* = .73), but only 50 percent of the variation in spring 1991 scores is accounted for by fall 1990 scores.[5]

The CBRS increased from 3.6 to 3.8 with a correlation of *r* = .35 between fall and spring ratings. The relationship between fall and spring CBRS ratings was greatly affected by one classroom with a full classroom average score of 2.2 and a spring average score of 3.9.[6] The relationship between fall and spring CBRS ratings increased to *r* = .51 without this one "outlier" classroom.

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[4] PSI scores have been shown to increase at the rate of .32 to .44 per month of maturation, depending on the sample of children studied and the method used to calculate age-related differences. The gain score reported here is based on the difference score of individual fall to spring comparisons. The reliability of the difference score was computed to be quite low (.20), however, suggesting that interpretations of gains in Chapter 1-funded prekindergarten programs be made with caution.

[5] Forty-nine children (7.2 percent of the sample) scored lower on the spring PSI than on the fall PSI. Of those 49 children, 42 scored above the mean on the fall administration. Thus, a possible explanation of the fall to spring decreases is statistical regression.

[6] Further inspection of the data revealed that this classroom of 13 children had an average gain score on the CBRS of 1.8 compared to only .2 for the entire sample of 711 children. These 13 children had gain scores ranging from 1.3 to 2.1. The fact that every child in this one classroom showed such strong gains compared to children in other classrooms is grounds for speculation that this particular teacher did not have the same norms in mind as the other teachers when assigning the fall ratings.

Descriptive Analyses of Bronson Child Outcomes

The version of the Bronson Social and Task Skills Profile used in this substudy specifies a total of 36 behavior categories. Extensive analysis of these categories, however, led to the use of a smaller set to summarize the most important aspects of child mastery and social behavior which includes:[7]

- **Mastery Task Variables**
  - time in task with a goal: child engaged in any activity directed primarily at mastering a skill (except a gross motor skill) (e.g., matching; constructing a product; completing an academic, perceptual, or sorting task; counting tasks; puzzles);
  - task organizing and planning strategies: frequency that child gathers, groups, lays out materials and checks progress for accuracy; frequency that child shows consistent, coherent, rule-governed, orderly and sequenced behavior (e.g., child lines up the edge pieces or sorts by color before beginning a puzzle; while working on a task the observed child verbalizes a rule such as: "biggest one next");
  - tasks completed successfully: frequency that child completes a task successfully (e.g., observed child matches each set of materials by color that she was working on; child finishes the cutting of a heart shape and glues it to a larger piece of paper);
  - time distracted in mastery: child's attention wanders from a task with a goal (e.g., observed child reaches a difficult part of a task and after a brief effort to get through it, starts to play with her pencils);
- **Social Variables**
  - time in social interaction: child engaged in activities involving interaction with a peer (e.g., cooperative sociodramatic play, cooperative building, structural games with others);
  - time in organized social interaction (strategic): child engaged in activities involving structured interaction with another that includes social interaction with roles, social play, cooperative building, and true conversation (e.g., observed child is building a fort with others and they are working together to achieve a goal);
  - organizing strategies with peers: frequency that child suggests play, assigns roles or resources, or states rules while interacting with a peer—strategies may or may not be successful (e.g., observed child generates idea for social play: "let's make a city in the sand");

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[7] Refer to Appendix C of this report for more detailed definitions and examples of behavior categories.

- accommodating strategies with peers: frequency that child shares, trades, or takes turns while interacting with a peer—strategies may or may not be successful (e.g., when asked, the observed child gives some clay to another child; observed child asks to have a turn on a large wheeled vehicle and the other child agrees or resists);

  success in influencing peers: frequency of successful attempts to influence, use organizing strategies, or use accommodating strategies with peers (e.g., success is a self-initiated social interaction where the goal is realized);

- use of verbal means in social interaction: frequency of *verbal* attempts to influence peers (e.g., rather than gestures, demonstration, or physical force);

■ **Self-Management Variables**

- time uninvolved: child not engaged in any clearly focused social activity, nonsocial activity, or focused watching (e.g., child wanders aimlessly about the room, drifts from one brief encounter [with people or objects] to another without true engagement, or simply sits [stands, lies down] without doing anything);

- resists rules or teacher: frequency of failure to behave within the constraints of the setting when rules are clear and explicit (e.g., teacher announces: "time to start cleaning up now" and the child continues playing with the blocks while others have started to stack them on the shelf).

Child performance as measured by the Bronson during the spring of their prekindergarten year is summarized below.

Bronson mastery variables. A mastery task is simply a task with a goal, e.g., assembling a puzzle or erecting a block building. The variables associated with mastery tasks included time spent in tasks with goals, use of organizing and planning strategies while working on tasks, tasks completed successfully, and time distracted. We found that sample children spent about 38 percent of their overall observation time working on tasks with goals; they were distracted only 4 percent of this time.[8] While working on tasks, children used organizing and planning strategies at a mean rate of approximately 1.58 per minute. They completed tasks successfully almost 83 percent of the time.

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[8] The basis of time allocated to either mastery task or social behaviors is an artifact of the data collection method that selects particular events to observe; therefore, time allocations do not reflect how a child's behavior is distributed in time during the ordinary course of a classroom day.

Bronson social variables. Social behaviors observed included time spent in social interactions with peers, time spent in organized social interactions with peers, use of organizing and accommodating social strategies in interactions with peers, success in influencing peers, and the use of verbal means to influence. Under the structured observation conditions which maximized time in mastery or social interactions, approximately 50 percent of children's time over all observations was spent in social interactions, with 38 percent of this time (19 percent of observation time) spent in organized social interactions with roles, socio-dramatic play, cooperative building, or true conversation. During interactions with peers, children used organizing strategies at the rate of .58 strategies per minute and accommodating strategies at the rate of .15 strategies per minute. Children were successful in their attempts to influence peers 82 percent of the time and used verbal means to influence 81 percent of the time.

Bronson self-management variables. Variables reflecting lack of adequate self-management are time uninvolved and resisting rules or the teacher. Children in our sample were uninvolved only 2 percent of the time. They resisted rules or the teacher at the low rate of .05 instances per minute.

Correlations Among Spring Outcome Domains

In order to determine how competencies across areas of development were associated with each other, we performed correlational analyses among all variables in the three child outcome domains (Exhibit 4.6). While the PSI correlated moderately with the overall CBRS scores ($r = .38$), none of the Bronson variables correlated with the PSI or CBRS with an $r \geq .25$. The relative lack of overlap among the measures suggests that they provide assessments of somewhat independent aspects of child functioning and supports the usefulness and importance of using multiple measures and methods when assessing young children.

Exhibit 4.6
Significant Correlations Among Spring PSI, CBRS, and the Bronson Variables
($N = 621$)

Child Outcome Variable	PSI	CBRS
CBRS	.38***	
Bronson Mastery		
Time in task with goal	.15**	.13**
Organizing/planning strategies	.19**	
Tasks completed successfully		.11**
Time distracted in mastery		
Bronson Social		
Time in social activities		
Time in organized social interaction	.11*	
Organizing strategies with peers	.12*	.10*
Accommodating strategies	.10*	
Success in influencing peers	.13**	
Verbal means in social interaction		.09*
Bronson Self-Management		
Time uninvolved		
Resists rules or teacher	−.10*	−.09*

* $p \le .05$ ** $p \le .01$ *** $p \le .001$

The low intercorrelations obtained among most Bronson observation variables illustrate the lack of redundancy built into the measure (Exhibit 4.7). The consistent pattern of low relationships among Bronson variables within and across mastery, social, and self-management domains is similar to previous studies and demonstrates the multidimensionality of the mastery task and social emotional domains.

Exhibit 4.7
Significant Intercorrelations Among Bronson Variables
(*N* = 621)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Bronson Mastery												
1. Time in task with goal												
2. Organizing/planning strategies	.13**											
3. Tasks completed successfully	.20***	.12**										
4. Time distracted in mastery		.20**	−.25***									
Bronson Social												
5. Time in social activities	−.14***		.10*	−.16**								
6. Time in organized social interaction	.18***	.13**			.20**							
7. Organizing strategies with peers	.13*	.19***				.28***						
8. Accommodating strategies		.13**			−.18**							
9. Success in influencing peers		.26***	.10*			.16***		.12**				
10. Verbal means in social interaction	.15***				.11*	.24***	.14**	−.28***				
Bronson Self-Management												
11. Time uninvolved	−.13**	−.12**			−.25**	−.11**			−.19***	−.13**		
12. Resists rules or teacher	−.17***	.13**							−.11**	−.19**	.25**	

* $p \le .05$ ** $p \le .01$ *** $p \le .001$

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Relations Between Child Outcomes and Background Variables

Exhibit 4.8 shows the relationship between child outcome variables and age, gender, risk, and entering cognitive ability as measured by the fall PSI. Most of these variables were positively related to age and entering cognitive ability (the fall PSI score). Only one Bronson variable (the rate of resisting rules or the teacher) varied from this pattern, showing a positive correlation with age and a negative correlation with the PSI. The CBRS was more strongly correlated with the PSI than with age.

Gender was related to CBRS ratings and to two of the Bronson social variables (using social organizing strategies and using verbal means to influence others), with girls having higher scores. PSI scores, however, were not related to gender.

Risk-level, as well as age, was related to the PSI scores, with children having more risks scoring lower. Risk was also negatively related to the spring CBRS score. In the Bronson outcome data, children with more risks spent less time in social interaction, spent more time uninvolved, and resisted rules or the teacher more often; risk-level was not associated with any of the Bronson mastery behaviors of children.

Selection of Classroom Variables, Hypothesized Relationships, and Method of Analysis

The *Observational Study of Early Childhood Programs* included many more classroom variables than the subset we finally selected to relate to social and mastery competence outcomes. We chose classroom variables if they showed enough variance in our sample of Chapter 1-funded prekindergarten classrooms to allow meaningful analysis. We thought that measures of global classroom quality should be positively associated with social and mastery skills in children since the global quality measures reflect what early childhood experts consider "best practice" in classrooms for young children.

Exhibit 4.8
Significant Relationships Among Child Outcome Variables in Prekindergarten and Background Characteristics of Children

Child Outcome Variable	Age	Gender[1]	Risk-Level (0–9)	Entering Cognitive Ability (PSI)
PSI[2]				
Fall score	.25***		–.22***	
Spring score	.21**		–.20***	.73***
Change from fall to spring				–.41***
CBRS[2]				
Fall score	.15***	–.10**		.38***
Spring score	.15***		–.09*	.34***
Change from fall to spring		–.13***		
Bronson Mastery (Spring Scores)[3]				
Time in task with a goal	.15***			.11**
Task organizing/planning strategies	.19***			.16***
Tasks completed successfully	.12**			.12**
Time distracted in mastery				
Bronson Social (Spring Scores)[3]				
Time in social interaction			–.10*	
Time in organized social interaction	.09*			.14***
Organizing strategies with peers	.13**	–.11**		.11**
Accommodating strategies with peers	.11*			.10*
Success in influencing peers		–.08*		.13**
Use of verbal means in social interaction				
Bronson Self–Management (Spring Scores)[3]				
Time uninvolved			.10*	
Resists rules or teacher	.10*		.14***	–.11*

[1] negative correlations indicate that girls had higher scores

[2] $N = 673$

[3] $N = 586$

$^{*}p \le .05$ $^{**}p \le .01$ $^{***}p \le .001$

We selected teacher interaction variables that represent the level and focus of teacher involvement with children. Using a Vygotskian perspective that focuses on the importance of social support and "scaffolding" with children at the growing edges of their competence (Vygotsky's "Zone of Proximal Development") we hypothesized that overall teacher guidance (teaching and management) of children would be related to higher skills in both the social and mastery areas. In turn, we selected several additional variables to explore the nature of this guidance. We thought that a relative focus on "teaching" by classroom teachers would be related to higher levels of mastery skills and that this might be increased further by a focus on cognitive concepts and the use of positive teaching techniques by teachers. Since recent research with the Bronson instrument has suggested that one-to-one teacher control of behavior is negatively related to social and mastery skills in the classroom (Shonkoff et al., 1992), and since direct teacher control is typically required to resolve difficulties in independent social or mastery activities, we hypothesized that extensive one-to-one contact between teachers and children would be negatively related to independent social and mastery skills.

We selected classroom activities that reflect the variety of activities typically found in classrooms for young children. We hypothesized that larger amounts of classroom time spent in goal-directed activities (particularly activities that could be labelled "math/language") would be positively related to mastery outcomes. We also hypothesized that more classroom time spent in developmentally appropriate activities such as block construction and exploratory play (the latter including sand/water play and dramatic/fantasy play) should be related to increased skills in both social and mastery areas, and so we included these activities among the classroom variables.

Finally, we selected certain variables that address classroom structure and grouping arrangements. We hypothesized that lower child-to-adult ratios would allow more child-teacher interaction and therefore promote development of higher levels of skills in children. We included variables related to classroom grouping arrangements because we thought that smaller groups and individual activities would in turn be more appropriate for children and would be related to the development of higher levels of social and mastery skills. Because whole group activities are considered by child developmentalists to be less appropriate for this age group and therefore more stressful, we hypothesized a negative relationship between time spent in whole group activities and positive social and mastery outcomes for children.

First-order partial correlations, controlling for the average entering cognitive ability of the class, were used to explore all hypothesized relationships. As a first step, child outcome data were aggregated to classroom averages.[9] Preliminary analyses, further review of the literature on natural observations of children, and previous use of the Bronson instrument, led to a reconceptualization of Bronson variables as child outcomes and provided a rationale for aggregating the child-level data in this manner.[10]

It also became clearer that observations of children (or adults) also reflect the availability of materials and the social "setting." Even "laboratory" observations reflect the environment afforded children or adults, but more control for setting effects is built in by standardizing the stimulus situation for all observations. Clearly, this is not the case in natural classroom settings. Physical classroom characteristics, differences in the number and availability of materials, program differences, the number and behavior of teachers, and the number and behavior of peers could all be expected to affect the individual child's behavior in a classroom. Although Bronson observation conditions are designed to maximize the probability that a child's social and mastery skills can be evaluated in a natural setting, some conditions are more favorable than are others. To the extent that a classroom environment is highly constrained, or does not provide the types of materials and opportunities that permit a child to demonstrate independent social and mastery skills, individual child differences are masked. In such cases, the Bronson variables should reveal relatively more about variations among environments and relatively less about variations among children. Past research with this instrument has shown that classroom and program differences can be discriminated by evaluating differences in children's observed social and mastery behaviors.[11] Since the goals of this study focused on the effects of teacher and program on children's *classroom* experience, we aggregated children's behavior to the classroom level rather than keeping outcomes at the individual level to investigate its relationship to classroom characteristics and dynamics.[12]

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[9] Although a number of child outcome variables were associated with age, it was not suitable as a control variable because aggregation to the classroom-level made it meaningless. In addition, gender or risk-level were not used as control variables because so few outcome variables were found to be associated with them (refer to Exhibit 4.8).

[10] See Pierson, Bronson, Dromey, Swartz, Tivnan, and Walker (1983); Bronson, Pierson, and Tivnan (1984); Swartz and Bronson (1983); Swartz, Bronson, and Bryk (1983); Shonkoff, Hauser-Cram, Krauss, Upshur, Antaki, and Steele (1992).

Findings

Relations Between Global Classroom Quality and Child Outcomes

Few of the more global measures of classroom quality predicted outcomes for children, most likely because of the lack of overall variation among Chapter 1-funded classrooms on these measures (Exhibit 4.9). We did see a moderate positive correlation between the amount of time children spent in tasks with goals and teacher warmth and responsiveness.[13] In contrast, children spent less time in social interaction in classrooms in which the teacher was warmer and more responsive.

Children were on average less distracted in mastery tasks and less resistant to classroom rules or the teacher in classrooms with higher average ECERS scores. Children were also less distracted in mastery tasks in classrooms rated as more developmentally appropriate.

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[11] See Casey (1990) and Shonkoff, Hauser-Cram, Krauss, Upshur, Antaki and Steele (1992).

[12] Refer to Appendix C of this report for further discussion of the rationale for aggregating the data as classroom averages.

[13] E.g., speaking warmly, listening attentively, exploring reasons for rule infractions, encouraging, enthusiastic, positive attention to children as individuals, talking to children on a level they understand and bending or kneeling to establish eye contact, and encouraging cooperation and sharing.

Exhibit 4.9

Significant Partial Correlations Between Global Measures of Classroom Quality and Child Outcomes Controlling for Entering Cognitive Ability (PSI)

Child Outcome Variable	Average ECERS	DPP: Developmental Appropriateness	DPP: Developmental Inappropriateness	Arnett: Teacher Warmth/ Responsiveness
PSI				
Spring score				
Change from fall to spring				
CBRS				
Spring score				
Change from fall to spring				
Bronson Mastery (Spring Scores)				
Time in task with goal				.40**
Task organizing/planning strategies	-.30*			
Tasks completed successfully				
Time distracted in mastery	-.33*	-.38*		
Bronson Social (Spring Scores)				
Time in social interaction				-.30*
Time in organized social interaction				
Organizing strategies with peers				
Accommodating strategies				
Success in influencing peers				
Use of verbal means in social interaction				
Bronson Self-Management (Spring Scores)				
Time uninvolved				
Resists rules or teacher	-.34*			

*p ≤ .05 **p ≤ .01 ***p ≤ .001

Contrary to our expectations, the use of organizing and planning strategies by children was negatively related to classroom global quality as measured by the ECERS. A possible explanation for this correlation is that the ECERS was also positively related to one-to-one teacher involvement with children—we had hypothesized that such teacher involvement could limit the opportunities for children to exhibit more independent organizing and planning skills.

Relations Between Teacher Interaction and Child Outcomes

We examined the relationships between different types of teacher interactions and child outcomes, also considering the effect on children of being in classrooms in which there was no one-to-one interaction with adults (Exhibit 4.10). We found that the time teachers spent in teaching and management was positively related to children completing tasks successfully, but negatively related to the time children spent in social interaction.[14] Children were on average more likely to use verbal means to influence peers, however, when teachers spent more time teaching and when this teaching focused on cognitive concepts (language/number concepts). This pattern of findings suggests that although children were less likely to engage in social interaction with their peers when teachers spent more time teaching and focused on cognitive concepts, peer social interactions were at a higher-developmental level (verbal) when they occurred in these classrooms.

Overall cognitive ability of children (both in the spring of their prekindergarten year and the change in ability from fall to spring), and the average change in teacher ratings of child performance from fall to spring, were positively associated with the time teachers focused on cognitive concepts and their use of positive techniques such as explaining, questioning, praising and singing. Children were also more likely to complete mastery tasks successfully and to use

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[14] Teaching included interactions involving cognitive concepts; games with rules; information or questions intended to promote expressive, artistic, developmental, or self-help skills; management included interactions related to social rules and classroom organization.

Exhibit 4.10

Significant Partial Correlations Between Teacher Interactions and Child Outcomes Controlling for Entering Cognitive Ability (PSI)

Child Outcome Variable	Time in Teaching/ Management	Time in Teaching	Time Focused on Cognitive	Positive Techniques	No Children With One-to-One
CBRS					
Spring score					
Change from fall to spring			.40**	.36**	
Bronson Mastery (Spring Scores)					
Time in task with goal		.31*			
Task organizing/planning strategies					
Tasks completed successfully	.37*		.30*		.48***
Time distracted in mastery			.32*		
Bronson Social (Spring Scores)					
Time in social interaction	–.39**	–.42**			
Time in organized social interaction					
Organizing strategies with peers					
Accommodating strategies					
Success in influencing peers		.35*			
Use of verbal means in social interaction			.30*		
Bronson Self-Management (Spring Scores)					
Time uninvolved					
Resists rules or teacher					

*$p \le .05$ **$p \le .01$ ***$p \le .001$

verbal means in social interaction if teacher interactions focused on cognitive concepts. Interestingly, children were on average more likely to be distracted when the teacher focused her teaching on cognitive concepts. As we hypothesized, children were more likely to use independent organizing and planning strategies when working on tasks in classrooms in which there was less one-to-one interaction with adults.

Relations Between Selected Classroom Activities and Child Outcomes

We considered the relationship of goal-directed activities (a composite of activities thought to produce play that promotes learning, including: math/language-related activities, science and natural world activities, block construction, sewing, cooking, woodworking, table games and puzzles, and looking at books or pictures) to outcomes for children (Exhibit 4.11). In considering the findings that follow, it is important to remember how these individual activities related to each other in Chapter 1-funded classrooms: time spent in math/language activities was negatively related to time in sand/water play and time in dramatic/fantasy activities. Further, classrooms in which more time was spent in math/language activities were rated as less developmentally appropriate whereas classrooms in which more time was spent in dramatic/fantasy play were rated as more developmentally appropriate. Time spent in block construction, though considered important in early childhood classrooms, was not significantly related to the global measures of classroom quality.

As we expected, the time that children spent on average in tasks with goals (as measured by the Bronson) was positively related to classrooms with more goal-directed activities and more specifically to math/language-related activities. We also saw a positive relationship between classroom time spent in math/language-related activities and the cognitive ability of children and ratings of child performance by teachers (both spring scores and the change in scores from fall to spring).

Exhibit 4.11

Significant Partial Correlations Between Classroom Activities and Child Outcomes Controlling for Entering Cognitive Ability (PSI)

Child Outcome Variable	Goal–Directed Activities	Math/Language Activities	Block Construction	Sand/Water Play	Dramatic/Fantasy Play
PSI					
Spring score		.35*			
Change from fall to spring		.35*			
CBRS					
Spring score		.39**			
Change from fall to spring		.36*			
Bronson Mastery (Spring Scores)					
Time in task with goal	.36*	.33*		–.32*	
Task organizing/planning strategies				–.37*	
Tasks completed successfully			.30*		
Time distracted in mastery					
Bronson Social (Spring Scores)					
Time in social interaction					
Time in organized social interaction					
Organizing strategies with peers					
Accommodating strategies with peers					
Success in influencing peers					
Use of verbal means in social interaction					
Bronson Self–Management (Spring Scores)					
Time uninvolved				.46**	
Resists rules or teacher					

* $p \le .05$ ** $p \le .01$ *** $p \le .001$

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We had expected that mastery skills of children would be positively related to classroom time spent in dramatic/fantasy play and sand/water play, but this proved not to be the case with these data. Similarly, our expectation that the social skills of children would be related to classroom time spent in dramatic/fantasy play and block construction did not occur. Among the child outcome measures, time spent in block construction was related only to children completing more tasks successfully. In fact, children were less likely to spend time in tasks with goals or to use organizing and planning strategies (i.e., gathering and grouping materials; checking progress for accuracy; use of consistent, sequenced behavior) in classrooms in which more time was spent in sand/water play. Remember, however, that sand/water activities are often exploratory in nature rather than goal-directed (and were classified as exploratory classroom activities in the main study), requiring children to use few or no organizing and planning strategies to sustain the activity. We also saw that children were on average more uninvolved in classrooms in which more time was spent in sand/water play. We can only speculate on this relationship: the classroom observations occurred during the spring of the year when children may have become bored with this type of exploratory activity; the availability of sand/water play as an activity may be associated with children being in classrooms in which there was less teacher-direction and more freedom of choice in activities (and therefore more opportunity for uninvolvement). An analysis of the relationship of these activities to the mastery or social skill development of children may have been limited by the relatively small amounts of classroom time devoted to them across all sample classrooms.

Relations Between Average Child/Adult Ratios, Grouping Arrangements, and Child Outcomes

Average observed child/staff ratios and the use of various grouping arrangements (the proportion of time class was organized in small group activities only and time spent as one large group) were not associated with the cognitive achievement of children with one exception:

cognitive growth from fall to spring was negatively related to the average number of children per adults in a classroom (Exhibit 4.12).[15] More children per adult, on average, was also positively associated with resistance of classroom rules or the teacher.

Children in classrooms in which there were more children per adult were more likely to exhibit task organizing and planning strategies (i.e., gathering and grouping materials; checking progress for accuracy; use of consistent, sequenced behaviors) and to spend more of their time in organized social interaction (i.e., suggesting play, assigning roles and resources, stating needs while interacting with peers). Children were on average less likely to be uninvolved in classrooms in which there were more children per adult. This pattern of relationships would have been more surprising if it had not become clear they were confounded with group size and type of activity in these data. It must also be remembered that in these classrooms more children per adult was associated with a number of other classroom characteristics and dynamics: less classroom time in sand/water play, less time in small group activities, more whole class grouping arrangements, and the likelihood that children had fewer one-to-one interactions with an adult—classroom characteristics that were found to be associated with outcomes for children.

In contrast, we saw that children were less likely to use task organizing and planning strategies (i.e., gathering and grouping materials; checking progress for accuracy; use of consistent, sequenced behavior) and less likely to use organizing strategies with peers (i.e., suggesting play, assigning roles and resources, stating needs while interacting with peers) in classrooms in which more time was spent in small group arrangements. The use of small group arrangements was also associated with children spending more time uninvolved and being less resistant to classrooms rules or the teacher. We interpret these findings to indicate that a number of classroom characteristics that were also associated with more children per adult (i.e., less one-to-one

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[15] Remember that a majority of the classrooms met NAEYC guidelines regarding the ratio of children to adults. The average observed ratios were 10:1 or better in 67 percent of the classrooms, between 10:1 and 15:1 in 27 percent of the classrooms, and between 15:1 and 20:1 in only six percent of the classrooms.

Exhibit 4.12

Significant Partial Correlations Between Average Child/Staff Ratio, Classroom Grouping Arrangements, and Child Outcomes Controlling for Entering Cognitive Ability (PSI)

Child Outcome Variable	Average Ratio	Time in Small Groups Only	Time in Whole Class Grouping
PSI			
Spring score			
Change from fall to spring	–.32*		
CBRS			
Spring score			
Change from fall to spring			
Bronson Mastery (Spring Scores)			
Time in task with goal			
Task organizing/planning strategies	.36*	–.35*	
Tasks completed successfully			
Time distracted in mastery			
Bronson Social (Spring Scores)			
Time in social interaction			
Time in organized social interaction	.33*		
Organizing strategies with peers		–.33*	
Accommodating strategies with peers			
Success in influencing peers			
Use of verbal means in social interaction			
Bronson Self-Management (Spring Scores)			
Time uninvolved	–.31*	.32*	
Resists rules or teacher	.51**	–.32*	

* *p* ≤ .05 ** *p* ≤ .01 *** *p* ≤ .001

interaction between individual children and an adult, more time in whole class grouping arrangements, and less time in small groups) resulted in less direct supervision by the classroom teacher and more opportunities for independent actions (related to both tasks and peer social interactions) by children. Looked at another way, teachers in classrooms enrolling more children per adult may end up spending a lot of time organizing the time of children. This attention to classroom organization may create a "classroom climate" regarding organizing and planning that is supported by the teacher. Children engage in fewer activities with peers and spend relatively more time resisting the rules set by the teacher.

Summary

Few of the more global measures of classroom quality were related to child outcomes, probably due to the lack of variation among Chapter 1-funded classrooms on these measures. Children, as a class, were consistently less likely to be distracted or to resist classroom rules or the teacher in classrooms with higher average ECERS scores and higher ratings of developmental appropriateness. The warmth and responsiveness of teachers was also positively associated with the time children spent in tasks with goals, but negatively associated with time in peer social interaction (recall, however, that teacher warmth and responsiveness was also associated with time spent in teaching/management, particularly teaching).

We did find a number of predictable relations between teacher interactions and child outcomes. Interestingly, teacher interactions (particularly time in teaching and management) that promoted task-related behaviors in children were negatively associated with the amount of social interaction among peers. Children were, however, more likely to use verbal means to influence peers in classrooms in which teachers focused their time on teaching and specifically on cognitive concepts.

Our composite of goal-directed activities thought to produce play that promotes learning did little to predict child outcomes beyond time spent in tasks with goals. As would be expected, the cognitive achievement of children and teacher ratings of child performance (including spring scores and changes in scores from fall to spring) were positively associated with classroom time spent in math/language-related activities. Sand/water play, an exploratory activity in these classrooms, was negatively related to the time children spent in tasks with goals or their use of task organizing/planning strategies. Our expectation that the social skills of children would be related to classroom time spent in dramatic/fantasy play and block construction did not occur, perhaps because relatively little time was spent in these types of activities across all classrooms.

The effect of children being in classrooms with higher ratios of children to adults was inconsistently related to child outcomes for a number of reasons. First, the distribution of average ratios across classrooms was relatively narrow with most classrooms meeting NAEYC guidelines. Second, higher ratios were associated with a number of other classroom characteristics and dynamics, thus confounding any relationships that did emerge through simple correlations.

Stability of Child Outcomes From Prekindergarten to Kindergarten

To consider the question of whether child outcomes were stable from prekindergarten to kindergarten, we conducted correlational analyses between the spring prekindergarten and spring kindergarten scores of children. These correlations were conducted separately for the teacher ratings of child performance (CBRS in prekindergarten and kindergarten) and cognitive achievement (PSI in prekindergarten and PPVT-R in kindergarten). Essentially, we asked whether high-scoring children at the end of prekindergarten were also high-scoring children at the end of kindergarten and whether those who scored lower in preschool continued to be lower scoring children in kindergarten.[16]

As we anticipated, the prekindergarten and kindergarten teacher ratings of child performance were only weakly related ($r = .29$, $n = 126$, $p \leq .001$). What cannot be discerned is whether this weak relationship is due to a lack of stability in child performance from year-to-year or if teachers used the CBRS differently in rating the behavior of children depending on what they witnessed or experienced in the context of their own classrooms. In terms of cognitive achievement, the PSI and PPVT-R standard scores of children showed a moderately positive relationship ($r = .40$, $n = 128$, $p \leq .001$).

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[16] Two more complex analyses of stability were dropped when the study design was revised to follow only 131 sample children into 48 kindergarten classrooms. These analyses would have addressed the questions: Is the relationship found between prekindergarten (prek) environments and prek outcomes the same as that between prek environments and kindergarten (k) outcomes? Is the relationship between prek environments and prek outcomes the same as the relationship between k environments and k outcomes?

CHAPTER FIVE

THE CONTINUITY/DISCONTINUITY OF EXPERIENCE FROM PREKINDERGARTEN TO KINDERGARTEN

In this chapter, we present findings regarding the nature and degree of programmatic continuity/discontinuity experienced by sample children as they moved from Chapter 1-funded prekindergarten classrooms to kindergarten. We also describe policies and practices of these prekindergarten and/or kindergarten programs designed to assist in the transition of children from one environment to the next and to reduce discontinuities between these settings.

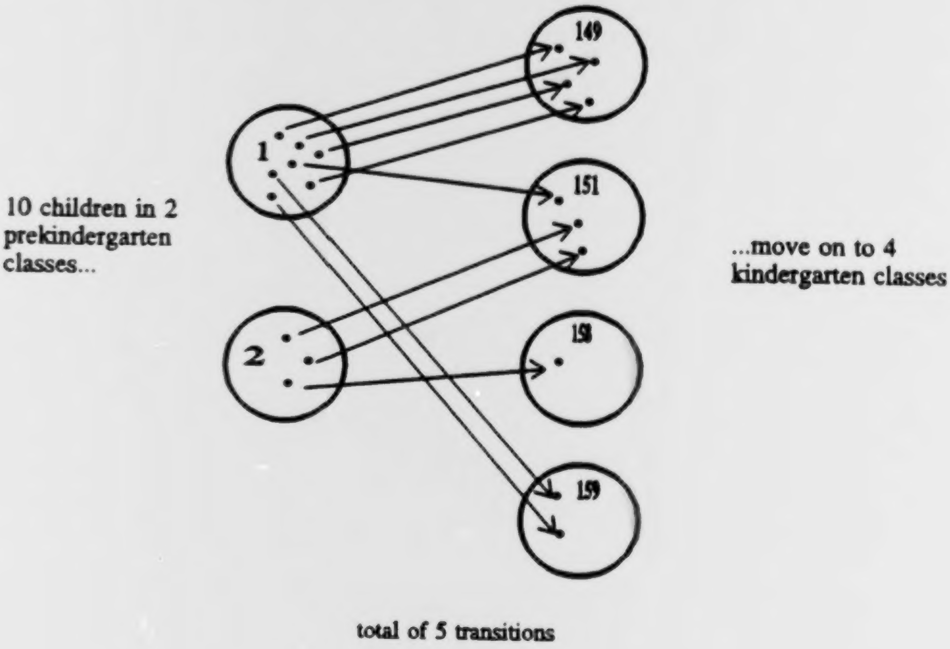
As recently defined by Love, Logue, Trudeau, and Thayer (1992),

> Continuity and discontinuity refer to the experience children have as they move from one environment or setting to another. If the two environments are similar or compatible, ... the behaviors children learn in the first setting are appropriate in the second, and adults respond to children in the second setting in ways that are consistent with the expectations established in the first. If the two environments are different or incompatible, children may . . . . find that established ways of responding are no longer appropriate or that they simply have no experiential basis for knowing how to behave in the new environment. One way to enhance the benefits of early childhood programs may be for schools to provide programs and services that smooth the discontinuities that children frequently experience when making the transition from preschool or home to kindergarten. (p. 5)

Following children between prekindergarten and kindergarten in order to assess continuity/discontinuity of experience was strikingly complex. The sample children who were assessed during their prekindergarten year moved from 55 Chapter 1-funded prekindergarten classrooms located in 49 buildings to approximately 222 kindergarten classrooms located in 84 buildings. In order to explore the relationship between these environments, we had to create a new unit of analysis that linked data from a given prekindergarten to data from a given kindergarten classroom. We called the new unit of analysis the "transition."

Exhibit 5.1 illustrates how we defined and formed transitions. The exhibit depicts two prekindergarten classrooms (circles #1 and #2) with seven and three children, respectively, represented by dots. The arrows symbolize the 10 prekindergarteners moving on the next year to four kindergarten classrooms (#149, #151, #158, and #159). The children from

Exhibit 5.1
Illustration of the Transition Unit of Analysis


10 children in 2 prekindergarten classes...
1
2
149
151
158
159
...move on to 4 kindergarten classes
total of 5 transitions

prekindergarten #1 move on to three of the kindergartens (#149, #151, and #159); the children from prekindergarten classroom #2 move on to two kindergartens (#151 and #158). There are five unique transitions for these 10 children. The number of children in the transitions ranges from one (from #2 to #158) to four (#1 to #149). Thus, a "transition" is operationally defined as a couplet of one prekindergarten classroom and one kindergarten classroom, each enrolling one or more sample children. Prekindergarten and kindergarten classrooms may each separately be members of more than one transition couplet or unit.

We randomly selected a subset of 48 kindergartens (enrolling at least one sample child) and ended up with 131 sample prekindergarteners to follow into kindergarten. These 131 prekindergarteners had been enrolled in 39 Chapter 1-funded prekindergartens, resulting in 56 unique transitions. There are certain factors at work that kept the actual number of combinations below the potential number of transitions. For example, 73 percent of the children in our kindergarten sample attended kindergarten in the same buildings as their Chapter 1-funded prekindergarten classrooms, and this greatly limited our dispersion pattern. On the other hand, in practice children enter kindergarten from multiple types of settings—home, care by babysitters, family daycare, daycare centers, Head Start—so the complexity we encountered underestimates what could be expected in a more complete study of transition.

This chapter begins with a comparison between the 55 prekindergarten classrooms and the 48 kindergarten classrooms in our sample. This information forms the basis of analyses presented later in the chapter that compare the degrees of continuity/discontinuity experienced by children in the 56 unique transitions.

A Cross-Sectional Comparison of Selected Classroom Characteristics and Processes

Using a cross-sectional approach, we first analyzed continuity/discontinuity using the classroom and teacher as the units of analysis. The classroom characteristics and processes used to compare prekindergarten and kindergarten classrooms included: level of teacher education and experience; composition of the classroom; activities, groupings, and teacher interaction with children; and measures of global quality.

Teacher Education and Experience

Prekindergarten and kindergarten teachers uniformly reported having at least some training related to early childhood in the past year (Exhibit 5.2). Fewer kindergarten than prekindergarten teachers, however, reported that they held a state license or certificate in early childhood education or had early childhood teaching experience.

Exhibit 5.2
Comparison of Prekindergarten and Kindergarten Teachers in Terms of Percentages of Teachers Having Selected Staff Qualifications

Staff Qualifications	**Prek** (*N* = 55)	**Kdg** (*N* = 48)
Early childhood training[1]	100%	100%
State early childhood ed. license	71	60
Early childhood teaching experience[2]	55	33

[1] includes any and all early childhood training
[2] note: difference would be significant if the two samples satisfied the independence assumption of the chi-square test

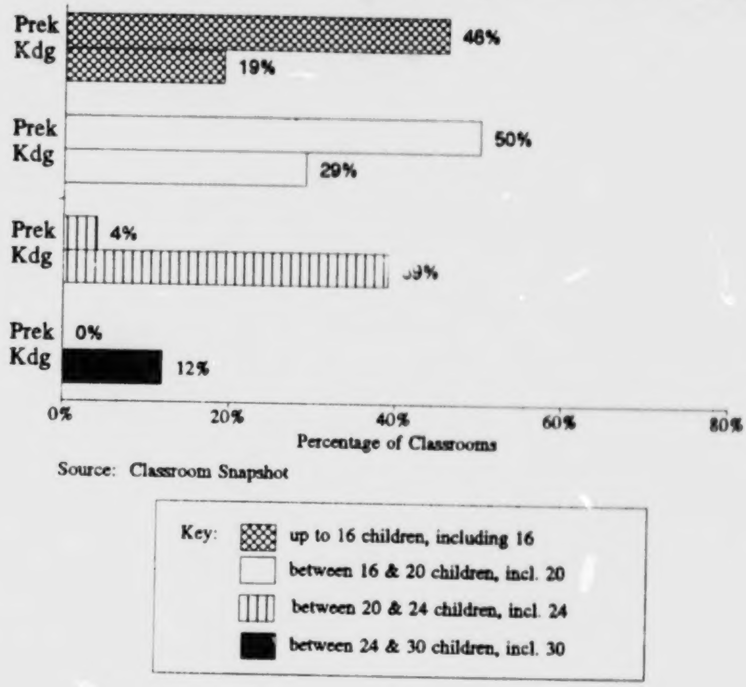
Source: Teacher Interview

Classroom Composition

Kindergarten classrooms were on average larger than prekindergarten classrooms in terms of group size and child/staff ratio. Prekindergartens had observed group sizes that averaged 16 children; kindergartens averaged 20.1 children (Exhibit 5.3). The more dramatic increase in the average observed number of children per adult (from 9.3:1 in prekindergarten to 16.7:1 in kindergarten) was largely due to the rarity of assistant teachers or aides in kindergarten classrooms (Exhibit 5.4). These findings indicate that children were likely to move from prekindergarten classrooms that met the child/staff ratio guidelines of the National Association for the Education of Young Children (NAEYC) to kindergarten classrooms of much lower quality in terms of ratio. (NAEYC guidelines recommend ratios of 8:1 to 10:1 for five-year-olds, depending upon group size, and 10:1 to 12:1 for six- to eight-year-olds.)

Exhibit 5.3

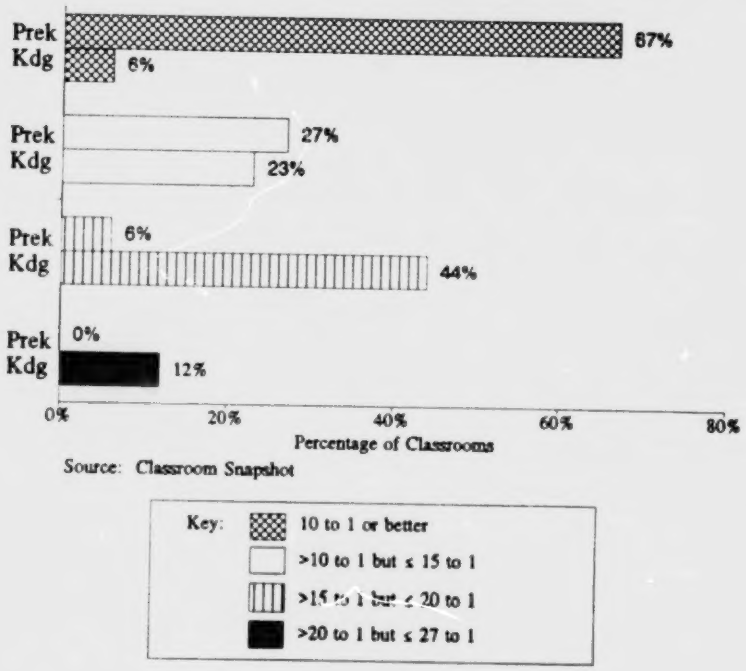
Distribution of Group Sizes in Prekindergarten and Kindergarten Classrooms



Source: Classroom Snapshot

Exhibit 5.4

Distribution of Ratios in Prekindergarten and Kindergarten Classrooms



Source: Classroom Snapshot

The Classroom Day: Teacher Interactions, Activities, and Grouping Arrangements

Although the use of positive techniques by teachers (i.e., explaining, questioning, praising, and singing) varied little from prekindergarten to kindergarten, we saw dramatic changes in a number of other types of teacher interactions, activities, and grouping arrangements (Exhibit 5.5). Kindergarten teachers spent more time in teaching/management and specifically much more time in teaching. They focused their interactions more on cognitive concepts. Kindergarten children were less likely to spend time working in small groups in kindergarten in favor of more whole-class grouping arrangements. Activities were more goal-directed; math/language-related activities, in particular, represented a larger percentage of the time. What is not known at this point, is the impact of these changes on child outcomes. In the next section, we do begin to see the impact of these changes on the more global ratings of classroom quality.

Exhibit 5.5
Comparison of Prekindergarten and Kindergarten Means
and Standard Deviations on Selected Interactions, Activities, and Grouping Arrangements

Classroom Variables	Prek (N = 55)		Kdg (N = 48)		Effect Size of Significant Differences[1]
	Mean	(*SD*)	Mean	(*SD*)	
Teacher Interaction					
Time in teaching/management	58%	(18)	79%	(8)	1.49
Time in teaching	39	(16)	65	(14)	1.71
Time focused in cognitive	44	(19)	55	(16)	.61
Use of positive techniques	66	(18)	61	(13)	Not Sig.
Activities					
Goal-directed activities	34	(13)	47	(14)	.96
Math/language-related activities	7	(8)	32	(14)	2.25
Grouping Arrangements					
Time in small groups only	46	(18)	23	(19)	1.24
Time in whole-class grouping	41	(14)	48	(17)	.43

[1] note: the two samples of classrooms did not satisfy the independence assumption of the *t*-test

Sources: Classroom Snapshot; Adult-focused Observation

Global Measures of Classroom Quality

The overall quality of sample Chapter 1-funded prekindergarten classrooms and kindergarten classrooms was compared using three instruments: the Early Childhood Environment Rating Scale (ECERS), the Description of Preschool Practices (DPP), and the Arnett Global Rating Scale (the Arnett).

As a group, the prekindergarten classrooms were consistently of higher quality than were kindergarten classrooms on these global measures. While the average ECERS scores for both prekindergarten and kindergarten classrooms were above the scale midpoint (4.0), the average prekindergarten score (4.7) was closer to the scale's "good" criterion (5.0) than was the average kindergarten score (4.1) (Exhibit 5.6). While 34 percent of the prekindergarten classrooms scored in the "good" to "excellent" quality range, only 10 percent of the kindergarten classrooms fell into the range of "good" quality (Exhibit 5.7).

DPP results indicated that appropriate practices were observed "somewhat" to "very much" on average in prekindergarten classrooms but "not at all" to "somewhat" in kindergarten classrooms (Exhibit 5.8). The observation of inappropriate practices was just the opposite: in the average prekindergarten classroom they were observed "not at all" to "somewhat" while in kindergarten they occurred, on average, "somewhat." The distribution of extreme DPP scores explains the story. While 40 percent of the prekindergarten teachers used appropriate practices "very much," only 17 percent of the kindergarten teachers were rated as doing so (Exhibit 5.9). Similarly 40 percent of the prekindergarten teachers used inappropriate practices "not at all," and only eight percent of the kindergarten teachers were so rated.

The teacher's emotional tone in interactions with children represented the third global aspect of the prekindergarten and kindergarten classroom experience that we assessed. We found that kindergarten teachers on average were rated between "somewhat" and "quite a bit" (2.8 out of a possible 4) on warm, responsive behaviors and between "not at all" and "somewhat" (1.6)

Exhibit 5.6
Comparison of Prekindergarten and Kindergarten Means and Standard Deviations on the Early Childhood Environment Rating Scale (ECERS)

ECERS	Prek ($N = 55$)		Kdg ($N = 48$)	
	Mean	(*SD*)	Mean	(*SD*)
Average Score[1,2]	4.7	(.7)	4.1	(.9)

[1] 1 = inadequate 3 = minimal 5 = good 7 = excellent

[2] note: difference would be significant (effect size =.76) if the two samples satisfied the independence assumption of the *t*-test

Exhibit 5.7
Comparison of Prekindergarten and Kindergarten Distributions of Average Scores on the Early Childhood Environment Rating Scale (ECERS)

ECERS	Percentage of Classrooms with Scores in Range:											
	1.0—1.9		2.0—2.9		3.0—3.9		4.0—4.9		5.0—5.9		6.0—7.0	
	Prek[2]	Kdg[3]	Prek	Kdg	Prek	Kdg	Prek	Kdg	Prek	Kdg	Prek	Kdg
Average Score[1]	0%	2%	0%	4%	13%	29%	53%	54%	29%	10%	5%	0%

[1] 1 = inadequate 3 = minimal 5 = good 7 = excellent

[2] $N = 55$

[3] $N = 48$

Exhibit 5.8

Comparison of Prekindergarten and Kindergarten Means and Standard Deviations on the Description of Preschool Practices (DPP)

DPP Subscales	Prek (*N* = 55)		Kdg (*N* = 48)		Effect Size of Significant Differences[2]
	Mean	(*SD*)	Mean	(*SD*)	
Developmentally Appropriate[1]	3.6	(.8)	2.8	(1.0)	.86
Developmentally Inappropriate[1]	2.4	(.8)	3.2	(.8)	1.00

[1] 1 = not at all 3 = somewhat 5 = very much like this classroom

[2] note: the two samples of classrooms did not satisfy the independence assumption of the *t*-test

Exhibit 5.9

Comparison of Prekindergarten and Kindergarten Distributions of Average Scores on the Description of Preschool Practices (DPP)

DPP Subscales	Percentage of Classrooms with Scores in Range:							
	1.0–1.9		2.0–2.9		3.0–3.9		4.0–5.0	
	Prek[2]	Kdg[3]	Prek	Kdg	Prek	Kdg	Prek	Kdg
Developmentally Appropriate[1]	2%	25%	24%	29%	35%	29%	40%	17%
Developmentally Inappropriate[1]	40	8	42	33	15	42	4	17

[1] 1 = not at all 3 = somewhat 5 = very much like this classroom

[2] *N* = 55

[3] *N* = 48

on harsh, negative behaviors (Exhibits 5.10 and 5.11). The average prekindergarten teacher was rated much higher (3.4) on warm, responsive behaviors and as low as kindergarten teachers on harsh, negative behaviors (1.3).

Exhibit 5.10
Comparison of Prekindergarten and Kindergarten
Means and Standard Deviations on the
Arnett Global Caregiver Rating Scale Subscales

Arnett Subscales	**Prek (N = 55)**		**Kdg (N = 48)**		**Effect Size of Significant Differences**[2]
	Mean	**(*SD*)**	**Mean**	**(*SD*)**	
Warmth/Responsiveness[1]	3.4	(.7)	2.8	(.7)	.89
Harshness[1]	1.3	(.4)	1.6	(.5)	.64

[1] 1 = not at all 2 = somewhat 3 = quite a bit 4 = very much
[2] Note: the two samples of classrooms did not satisfy the independence assumption of the *t*-test

Exhibit 5.11
Comparison of Prekindergarten and Kindergarten
Distributions of Subscore Averages on the
Arnett Global Caregiver Rating Scale Subscales

Arnett Subscales	**Percentage of Teachers with Scores in Range:**							
	1.0—1.5		**1.6—2.5**		**2.6—3.5**		**3.6—4.0**	
	Prek[2]	**Kdg**[3]	**Prek**	**Kdg**	**Prek**	**Kdg**	**Prek**	**Kdg**
Warmth/Responsiveness[1]	2%	0%	11%	38%	31%	40%	56%	23%
Harshness[1]	82	56	16	40	2	4	0	0

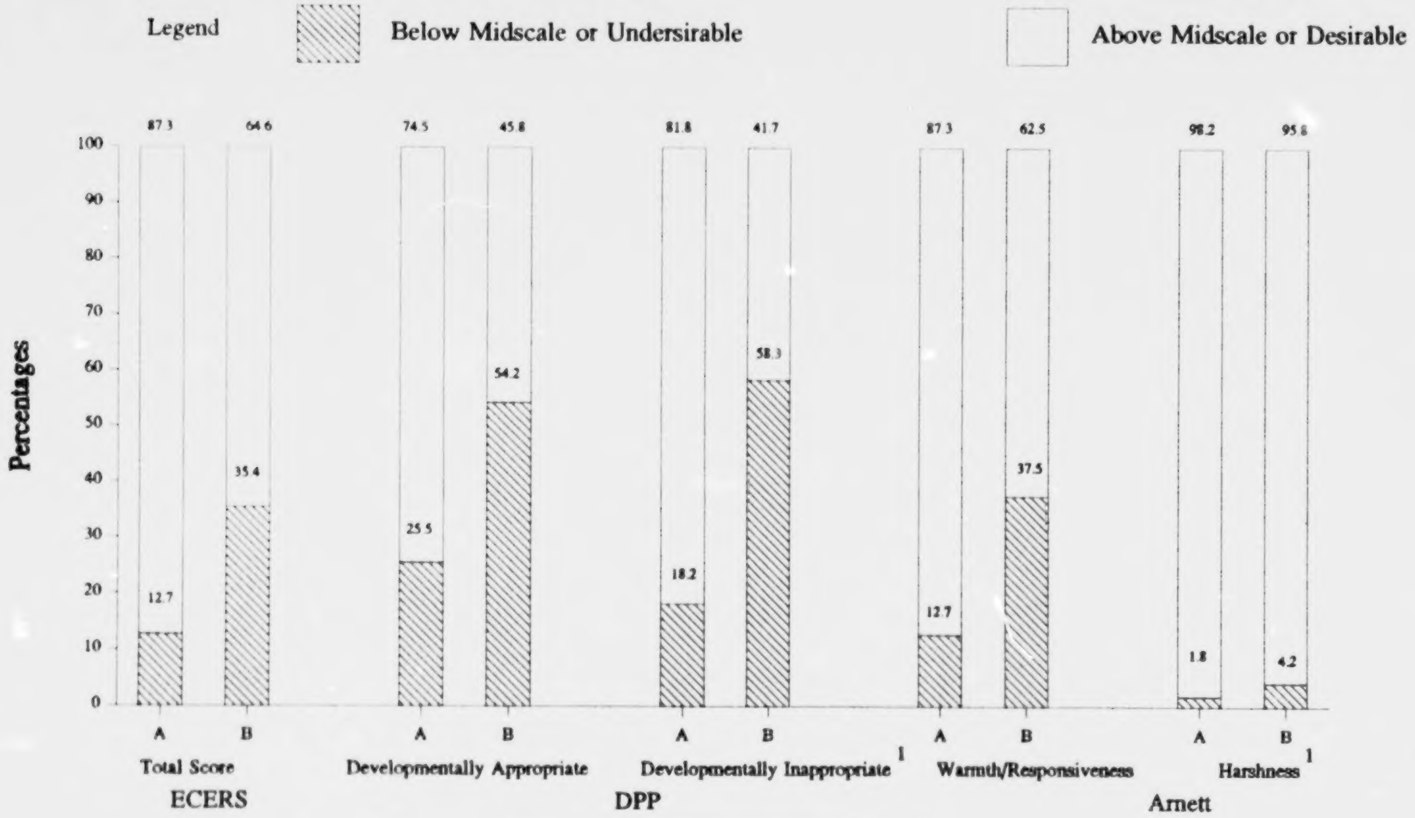
[1] 1 = not at all 2 = somewhat 3 = quite a bit 4 = very much
[2] N = 55
[3] N = 48

Comparing prekindergarten and kindergarten classrooms overall on these global quality measures, we see that classroom quality dropped from the first year to the next (Exhibit 5.12). As a rule, three quarters or more of the prekindergarten classrooms and teachers were rated above the midscale of a quality measure while never more than 60 percent of the kindergarten classrooms and teachers were rated so favorably.

The Transition Experience from the Point of View of the Child

Knowing how the average Chapter 1-funded prekindergarten classroom looked compared to the average kindergarten classroom may not tell us much about the experience of the individual child as he or she moved from one environment to the next. To examine transition experience more from the point of view of the child, we created graphic depictions of the prekindergarten and kindergarten years simultaneously, to represent the 56 transition experiences of our sample children. Notice in Exhibit 5.13, for example, that the horizontal and vertical axes respectively represent the prekindergarten and kindergarten years. Dotted reference lines extended from the midpoint of each scale divide the space into four quadrants. Focusing on the transition located at the bottom of quadrant II, we can say that this child came from a prekindergarten classroom with an average ECERS score between 5.0 and 5.5 (good, but not excellent quality) and the next year went to a kindergarten classroom with an average ECERS score of 1.5 (inadequate to minimal quality). Thus, this transition exemplifies *relative discontinuity* of environments, as measured by the ECERS. Of course, relative discontinuity can occur in the opposite direction if children are in transitions involving a lower-rated prekindergarten and a higher-rated kindergarten. These transitions are represented in quadrant III. Transitions found "deepest" in quadrants II and III (i.e., farthest from the reference lines) are those of greatest discontinuity on the measures. The remaining quadrants, I and IV, are where transitions of *relative continuity* are found. Transitions deepest in these quadrants represent greatest

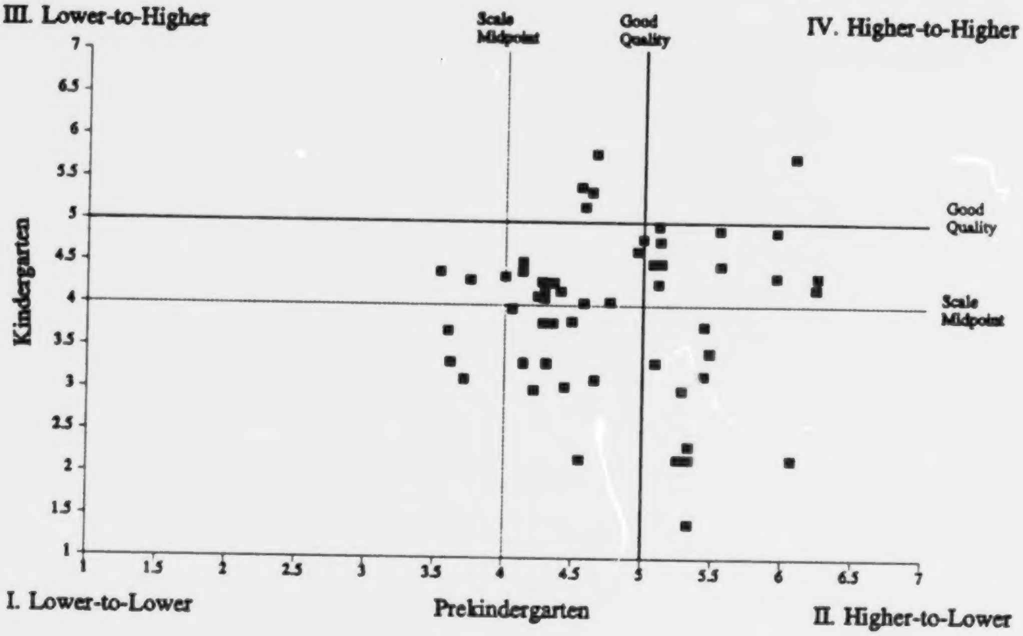
Exhibit 5.12
Comparison of Prekindergarten and Kindergarten Percentages of Classrooms Rated Below and Above the Midscales of the Global Classroom Measures



Key:
A - Prekindergarten *N* - 55
B - Kindergarten *N* - 48

[1] For this exhibit, negative, "undesirable" scales have been reversed so that the "above midscale" bar denotes the positive, "desirable" half of the scale.

Exhibit 5.13
Plot of Prekindergarten to Kindergarten Score Means for the Early Childhood Environment Rating Scale (ECERS) [1]
(*N* = 56)



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[1] 1 = inadequate 3 = minimal 5 = good 7 = excellent

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continuity. This is not to advocate, however, for transitions that involve a child moving from a lower quality prekindergarten to a lower quality kindergarten.

Looking more closely at the ECERS results shown in Exhibit 5.13 we see that most of the transition experiences fell in quadrants II and IV, involving movement from prekindergarten classrooms with higher ECERS scores to kindergarten classrooms with both higher and lower ECERS scores. If the reference lines are placed at a score of 5 (the solid lines, representing "good" quality), we see that only one of the 56 transitions involved a higher quality prekindergarten and a higher quality kindergarten. We believe that it is important not to lose sight of the less prevalent transition scenarios in this and the next several exhibits. They represent two years in the lives of real children, even though they might look like "outliers" in the exhibits.

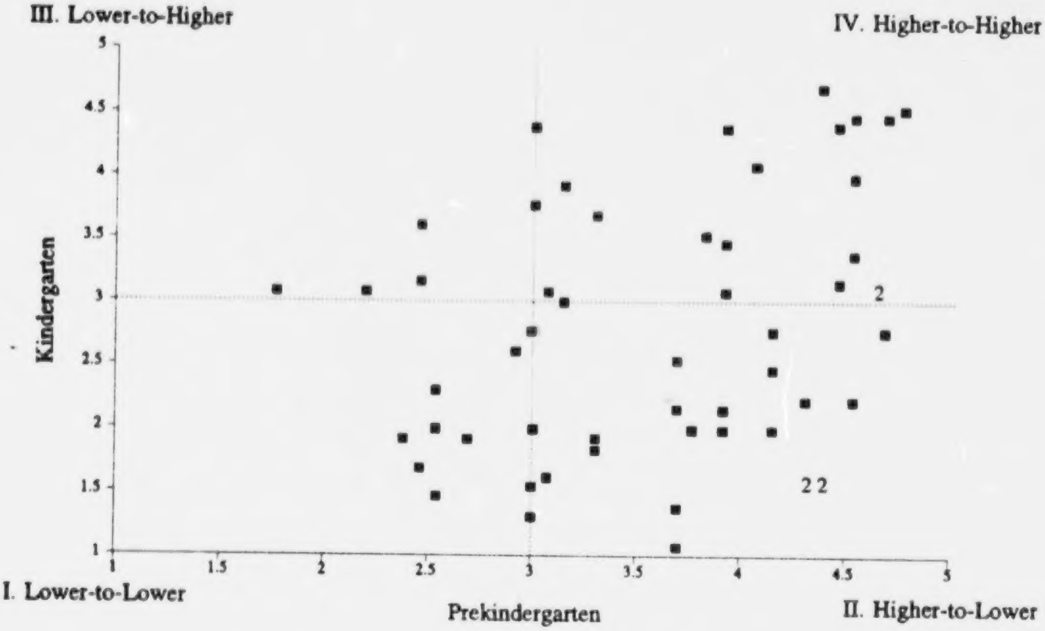
In terms of developmentally appropriate and inappropriate practices as measured by the DPP, we see slightly more "scatter" in the 56 transition experiences, than there were with the ECERS (Exhibits 5.14 and 5.15). Nevertheless, the most prevalent transition experiences go from Chapter 1-funded prekindergartens in which teachers were rated more developmentally appropriate to kindergarten classrooms in which the developmentally appropriate practices of teachers varied. This pattern was reversed for only a few of the transition experiences; that is, there were few transitions that involved less developmentally appropriate prekindergartens and more developmentally appropriate kindergartens.

On the Arnett, the majority of transitions involved movement from prekindergartens in which teachers were rated moderately high on warm, responsive behaviors to kindergartens in which the range of teacher ratings was much wider (Exhibit 5.16). At the same time, almost all prekindergarten and kindergarten teachers were rated low on harsh, negative behaviors and so nearly all transition experiences were of relative continuity on this measure (Exhibit 5.17). Two of the 56 transitions, however, did involve children moving from Chapter 1-funded

Exhibit 5.14

Plot of Prekindergarten to Kindergarten Score Means for the Description of Preschool Practices (DPP) Developmentally Appropriate Subscale[1]

(*N* = 56)



Key:

■ = 1 case
2 = 2 cases
3 = 3 cases
4 = 4 cases

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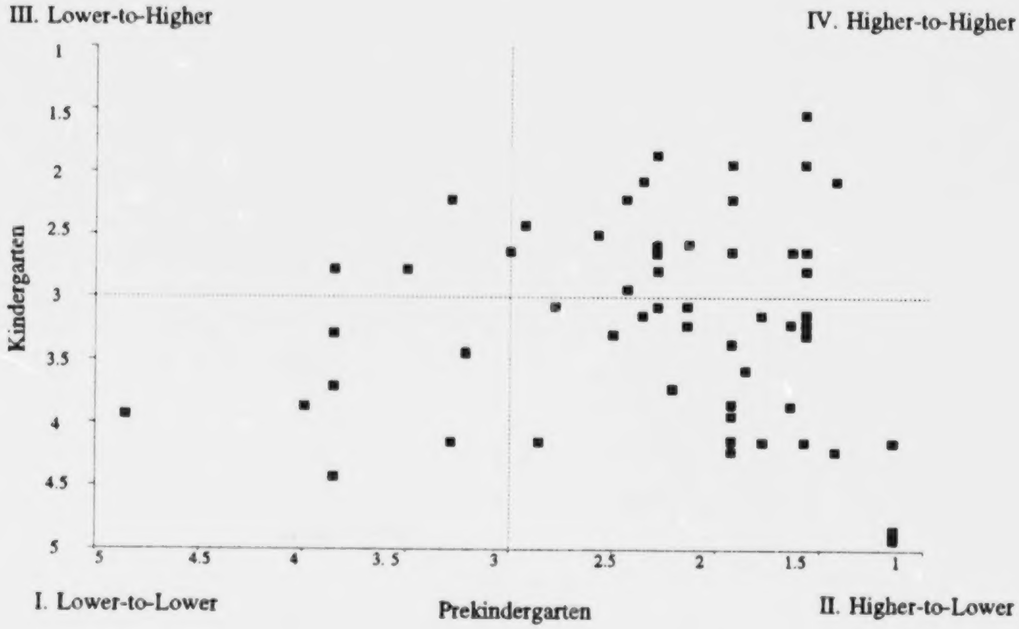
[1] 1 = rarely or never 3 = sometimes 5 = frequently or most of the time

Exhibit 5.15

Plot of Prekindergarten to Kindergarten Score Means for the Description of Preschool Practices (DPP) Developmentally Inappropriate Subscale[1]

(N = 56)

(Note: Axis scales are reversed on this "negative" measure to permit standardized interpretation of exhibit)



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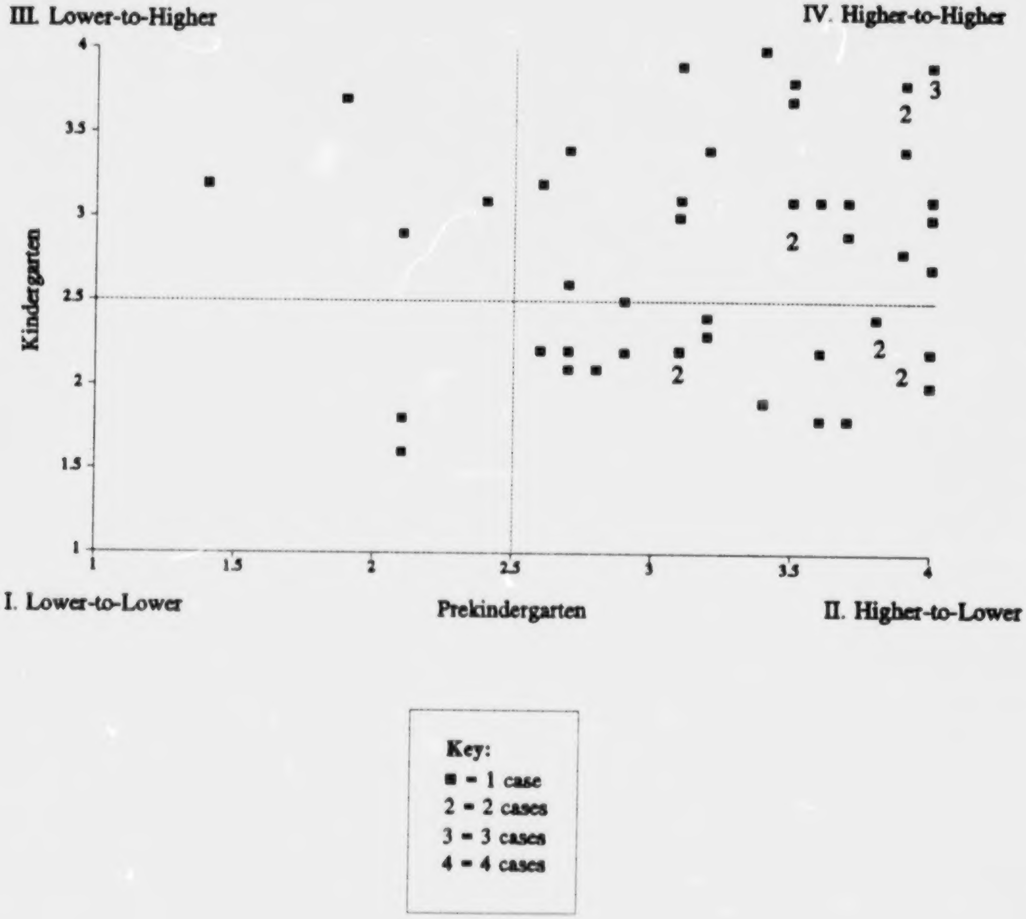
[1] 1 = rarely or never   3 = sometimes   5 = frequently or most of the time

Exhibit 5.16
Plot of Prekindergarten to Kindergarten Score Means for the Arnett Global Caregiver Rating Scale Warmth/Responsiveness Subscale[1]
($N = 56$)



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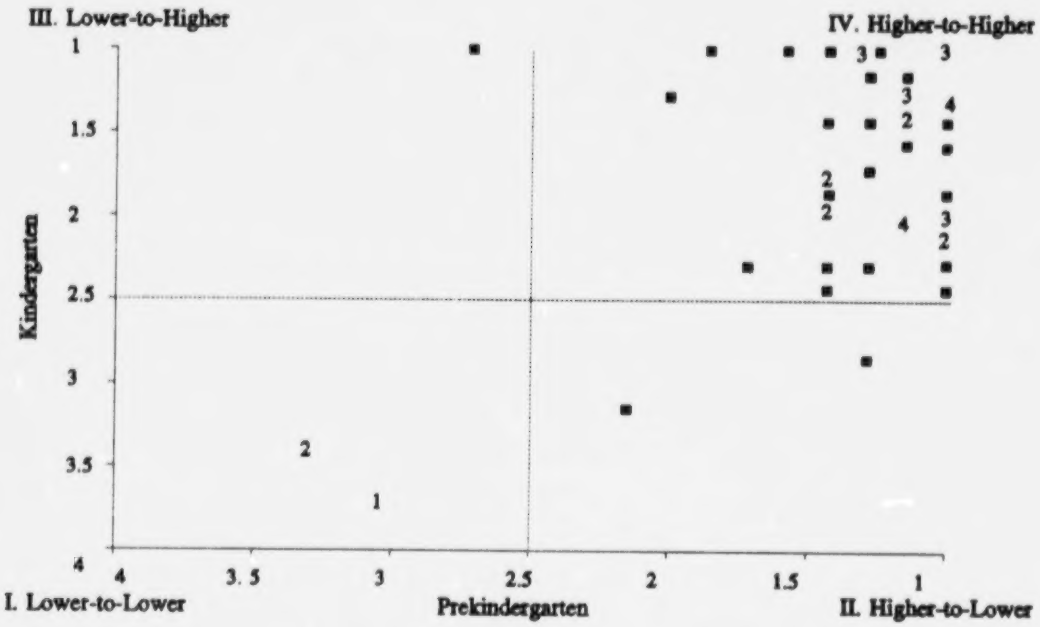
[1] 1 = not at all   2 = somewhat   3 = quite a bit   4 = very much

Exhibit 5.17

Plot of Prekindergarten to Kindergarten Score Means for the Arnett Global Caregiver Rating Scale Harshness Subscale [1] (*N* = 56)

(Note: Axis scales are reversed on this "negative" measure to permit standardized interpretation of exhibit)



Key:

■ = 1 case
2 = 2 cases
3 = 3 cases
4 = 4 cases

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[1] 1 = not at all 2 = somewhat 3 = quite a bit 4 = very much

prekindergarten classrooms in which teachers had higher ratings on harsh, negative behaviors to kindergarten classroom in which teachers used a similar, negative tone.

Findings Regarding Transition Processes

The ultimate purpose of transition processes and activities is to enhance the continuity of experience and therefore maximize the growth and development of children. In practice, both schools and classroom teachers establish connections between preschool programs (including Chapter 1-funded prekindergarten programs) and kindergartens in a number of ways to enhance continuity, including: articulation of policies, communication and coordination between prekindergarten and kindergarten teachers, communication and coordination between parents and teachers, and the provision or coordination of supplemental services for families as children move from one grade to the next.

Kindergarten teachers themselves may smooth the transition of children by altering the classroom environment over the course of the year. In the present study, less than half (43 percent) of the kindergarten teachers indicated that their classroom environment as of spring 1992 differed *substantially* from what it was in the fall of 1991. These teachers cited changes from fall to spring in the following areas:

- **Classroom physical environment.** The room arrangement was modified as part of an overall change in the kindergarten program (the combining of two classes into a team-teaching situation; a move from an open classroom concept to a self-contained classroom); changes were made in the classroom environment according to the developing abilities of the children (the addition of materials to existing activity centers as children learned to use them properly); centers were made larger or smaller according to the interests of children; additional centers were added; print materials and manipulatives were added to the classroom environment for use by children.
- **Scheduling of activities.** Activities came to involve less free exploration in favor of a more set routine with children being able to choose activities within parameters set by the teacher; lessons became longer and there was more independent work; children worked more independently as a whole group.

- **An emphasis on preparing for first grade.** The program became more academic than it was in the fall—by the spring children sat more as they did their work; lessons started involving words, stories, and writing; games became more instructional than "fun" like housekeeping.

- **Teacher interaction.** By the spring, children were involved more in class decisions and worked more independently of the teacher; some teachers used more questioning techniques and intervened less in order to encourage children to come up with solutions on their own, other teachers indicated they did more direct teaching, especially in reading.

In the next section we focus on the types of activities carried out by teachers to smooth the transition from prekindergarten to kindergarten and discuss related activities occurring at the school building level. Where appropriate, we relate these findings to those from the *National Transition Study* (Love et al., 1992). The above comments given retrospectively by teachers should make it apparent that our spring-to-spring comparisons of prekindergarten and kindergarten environments did not capture the within-classroom transition experiences orchestrated by kindergarten teachers from fall to spring.

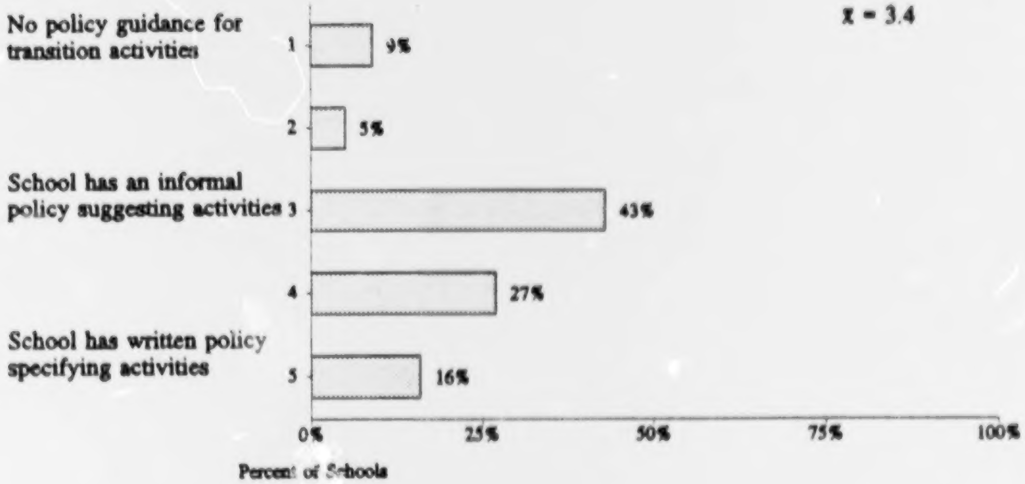
School Policies

Only 16 percent of schools that received sample children enrolled in a Chapter 1-funded prekindergarten program reported having a formal written school policy related to continuity (refer to Exhibit 5.18). At least 10 percent of the schools offered no policy guidance. Consistent with the *National Transition Study* findings, most other schools had "informal" policies that suggested continuity activities that reflected standard practices carried out in schools.

Communication and Coordination Among Teachers

Teacher-to-teacher connections between preschool programs and kindergartens may occur in three areas: coordination of curriculum, communication about children, and shared training

Exhibit 5.18
School Policies Specifying Transition Activities
(*N* = 44)



Source: Kindergarten Principal Interview

and staff orientations. As of spring 1991, about half (53 percent) of the Chapter 1 prekindergarten teachers indicated that they already knew the fall kindergarten assignments of all their children, and 62 percent had at least some contact with the kindergarten classrooms that their children would be attending. Almost a third of the Chapter 1 prekindergarten teachers (29 percent) reported that they did not yet know the fall kindergarten assignments of any children (Exhibit 5.19). Prekindergarten teachers who did have contact with kindergartens by this point in the year had typically talked with the teachers about children (58 percent), had visited the kindergarten classrooms (56 percent), and/or had talked about curriculum issues (49 percent).

Of kindergarten teachers who eventually received sample children, only a third (33 percent) indicated that they had known the prekindergarten assignments of all children in

Exhibit 5.19
Connections Between Chapter 1 Prekindergarten and Kindergarten Teachers

Chapter 1-Funded Prekindergarten Teachers	**Percentage (N = 55)**
Proportion of Children for Whom Knew Fall Kindergarten Assignments	
All children	53%
Most children	15
Some children	4
No children	29
Teachers Who Had Contact With Any Kindergarten Classrooms That Children Would Be Attending The Next Year	62%
Type of Contact[1]	
Talked with kindergarten teachers about children	58%
Visited kindergarten classrooms	56
Talked with kindergarten teachers about curriculum issues	49
Kindergarten teachers visited prekindergarten classroom	42
Sent work or information about her children to kindergarten teachers	35
Kindergarten Teachers	**Percentage[2]**
Proportion of Children For Whom Knew Prekindergarten Assignments	
All children	33%
Most children	29
Some children	29
No children	8
Teachers Who Had Contact With Any Prekindergarten Classrooms or Programs That Children Attended the Year Before	76%
Type of Contact[1]	
Talked with prekindergarten teachers about children	100%
Talked with prekindergarten teachers about curriculum issues	80
Visited prekindergarten classrooms	74
Received work or information on the children	71
Prekindergarten teachers visited classroom	51

[1] respondents checked all that applied

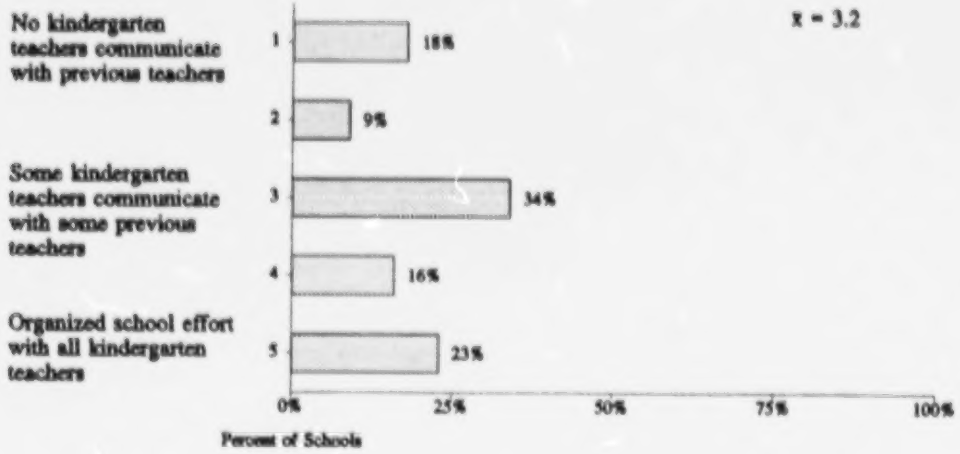
[2] note: N varied between 35 and 48 depending on items

Sources: Prekindergarten and Kindergarten Teacher Interviews their classrooms, and most teachers (76 percent) had some type of contact with the prekindergartens that their children had attended the previous year. Of the kindergarten teachers who did have contact with prekindergarten programs, they had typically talked with teachers about children (100 percent), talked about curriculum issues (80 percent), visited the prekindergarten classrooms (74 percent), received work or information about children (71 percent), and/or received a classroom visit from a prekindergarten teacher (51 percent).

Coordination of curriculum. Principals of school buildings housing kindergartens that enrolled sample children were asked to characterize the extent of the connection between the kindergarten program and all possible prekindergarten placements of children. While communication would seem essential to coordination and continuity, principals indicated that there was only limited communication about curriculum. Less than a quarter (23 percent) of the principals indicated that the school had an organized effort, involving all kindergarten teachers, to communicate with as many caregivers/teachers as possible about curriculum; less than a third (30 percent) indicated that the kindergarten curriculum built on the prekindergarten curriculum (see Exhibits 5.20 and 5.21). These findings, however, were much higher than they are in the nation as a whole. In the *National Transition Study*, Love et al. (1992) found that in 49 percent of the nation's schools, prekindergarten and kindergarten curricula were *independent* in 1991; results from the present substudy indicated that only 20 percent of the curricula were independent in kindergartens receiving children who had been enrolled in school-based prekindergarten classrooms funded all or in part with Chapter 1 funds. Despite the wide dispersion of children enrolled in Chapter 1-funded prekindergartens, we see school districts making efforts to coordinate programming across buildings.

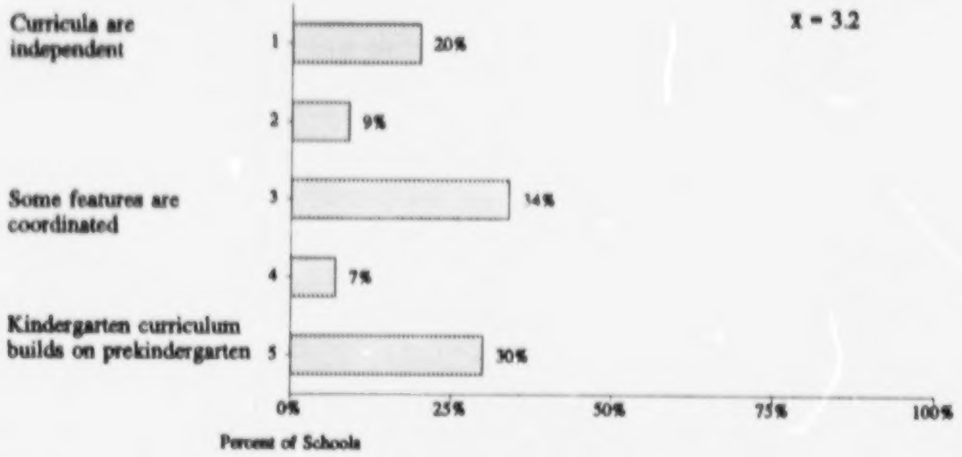
Communication about children. The extent to which kindergarten teachers received information about entering kindergartners generally, and the extent to which communication

Exhibit 5.20
Communication Between Kindergarten Teachers and Previous Caregivers/Teachers About Curriculum Issues
(*N* = 44)



Source: Kindergarten Principal Interview

Exhibit 5.21
Cooordination of Kindergarten Curriculum With Children's Prekindergarten Programs
(*N* = 44)



Source: Kindergarten Principal Interview

occurred between kindergarten teachers and previous caregivers/teachers is described in Exhibits 5.22 and 5.23, respectively. Principals reported that the majority of kindergarten teachers received at least *some* information about *some* entering children. The typical approach seemed to involve communication between teachers only when children were having adjustment problems. This is indicated by the mean rating of 3.2 and only 11 percent of schools reporting systematic communication with *all* previous caregivers/teachers.

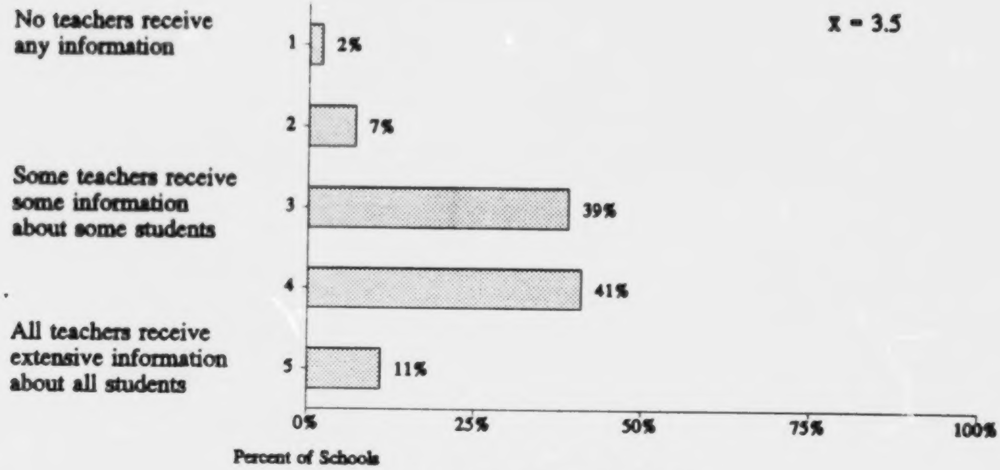
Joint workshops. Principals were asked about the extent to which staff from local prekindergarten programs (including Chapter 1-funded prekindergarten programs) participated in joint workshops with school staff on curriculum, child development issues, and other concerns. Half of the schools reported that more than 75 percent of staff from prekindergarten programs participated in such activities; another third of the schools (34 percent), however, reported that less than 25 percent of prekindergarten staff participated (no Exhibit).

Communication Between Parents and Teachers

Schools may offer a variety of activities to introduce parents of incoming children to the kindergarten program. The formality of these activities varied, ranging from annually scheduled meetings to more ongoing, informal communication between parents and teachers, and were very similar to the findings from the *National Transition Study* (Love et al., 1992).

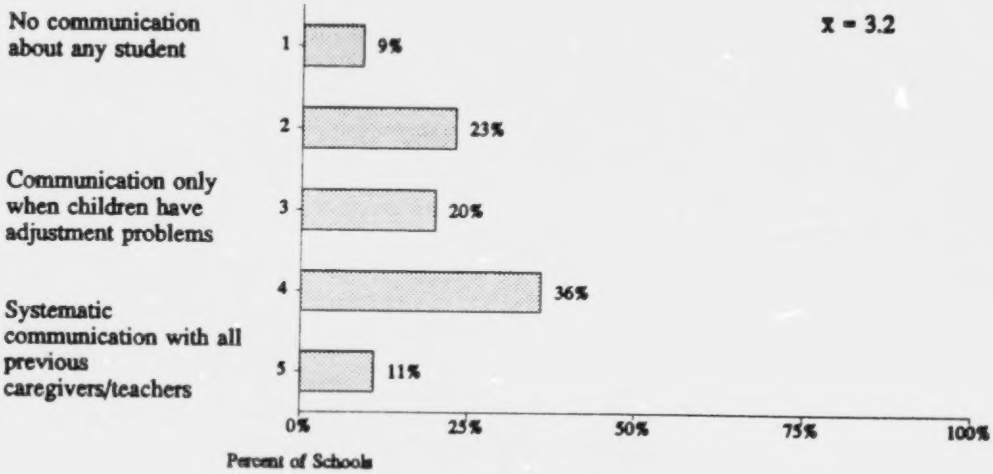
Parental rights and responsibilities. Almost all (91 percent) schools had at least some procedures for informing parents of entering kindergarten children of their rights and responsibilities in the public school system (Exhibit 5.24). Less than half (43 percent) distributed a written document to parents, scheduled a meeting to explain these rights, or provided a contact person for parents to obtain further information. Forty-seven percent of the schools implemented at least some of these procedures.

Exhibit 5.22
Receipt of Information About Entering Students by Kindergarten Teachers
(*N* = 44)



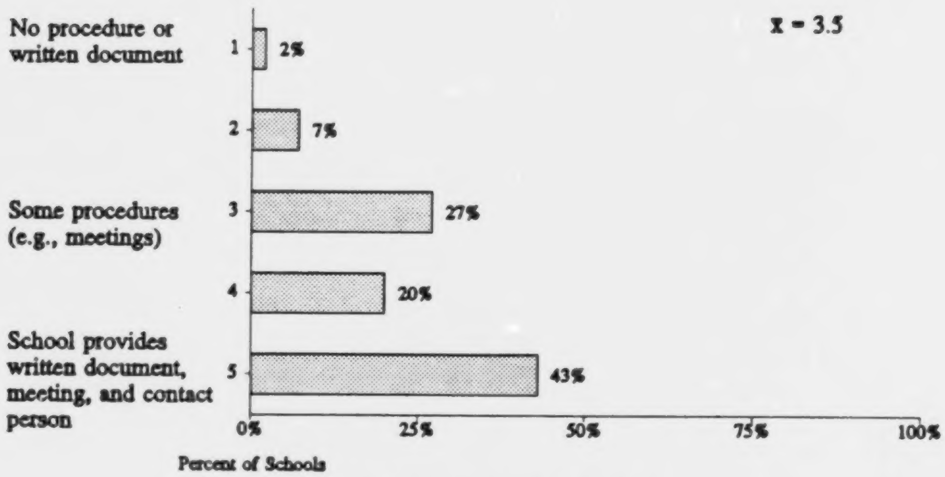
Source: Kindergarten Principal Interview

Exhibit 5.23
Communication Between Kindergarten Teachers and Previous Caregivers/Teachers About Entering Students
(*N* = 44)



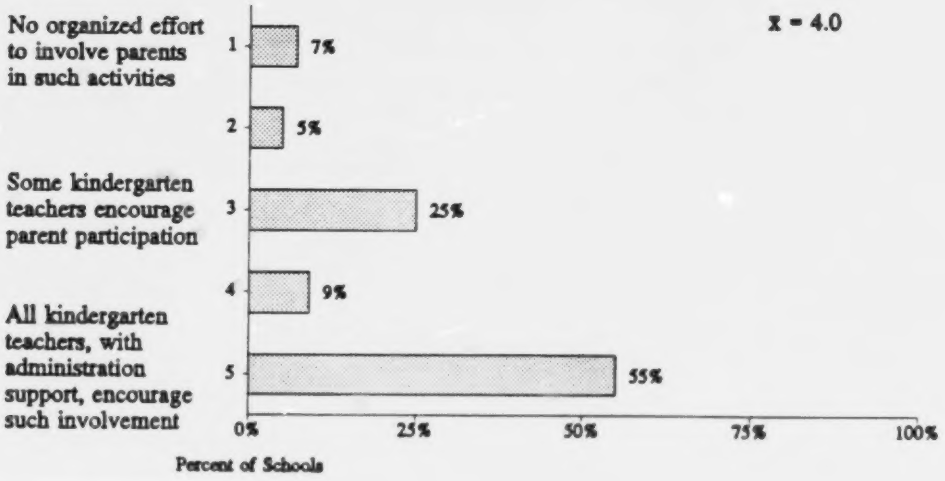
Source: Kindergarten Principal Interview

Exhibit 5.24
Procedures for Informing Incoming Parents of Their Rights and Responsibilities
(*N* = 44)



Source: Kindergarten Principal Interview

Exhibit 5.25
Involvement of Parents in Classroom Activities Aimed at Smoothing Children's Transition into Public Schools
(*N* = 44)

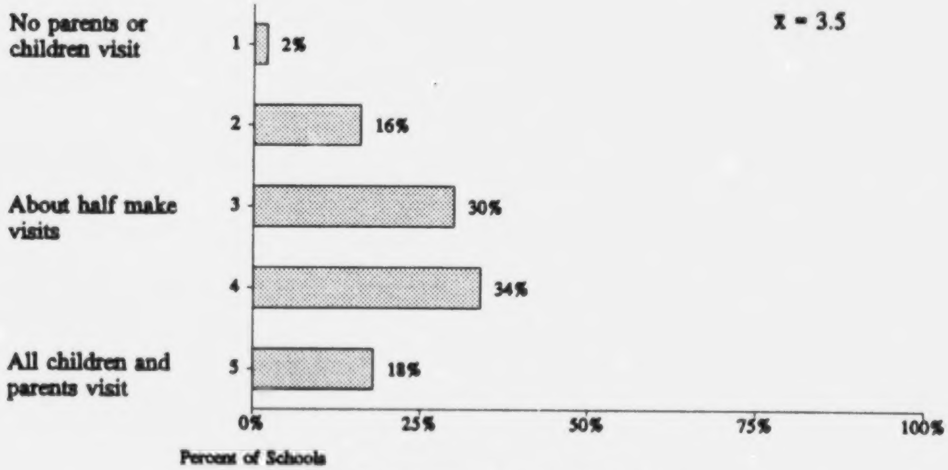


Source: Kindergarten Principal Interview

Parent involvement in transition activities. School principals reported a high degree of parental involvement in classroom activities aimed at smoothing children's transition into public school. In over half of the schools (55 percent), all kindergarten teachers (with administrative support) encouraged parents to be involved in such classroom activities; in an additional 34 percent of the schools, at least some kindergarten teachers encouraged involvement (Exhibit 5.25 on the previous page). Approximately half of the principals, however, estimated that less than half of the parents: (1) carried out activities at home to prepare their child for school (e.g., read books from a school reading list, talked to their children about what to expect in kindergarten, and/or (2) provided the kindergarten teacher with information or materials to help their child adjust to kindergarten (e.g., family photographs, a favorite toy, the child's nickname).

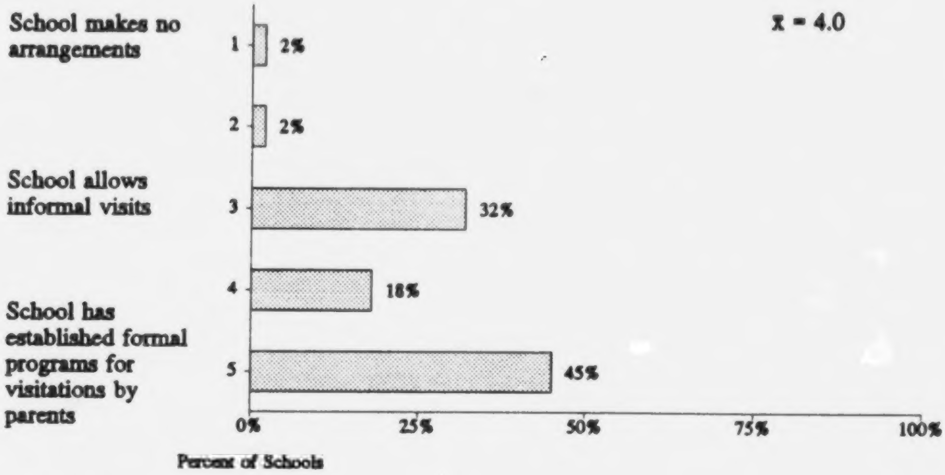
Visitations to the new school by parents prior to the beginning of the school year were more common, with 82 percent of the principals reporting that at least half of incoming children and parents visited their new school before the school year began (Exhibit 5.26). Similarly, 43 percent of the principals reported that more than half of the parents of incoming children participated in parent-teacher conferences before school started. When asked, approximately three-quarters of Chapter 1 prekindergarten teachers (78 percent) and receiving kindergarten teachers (73 percent) reported that they had met all the parents of the children in their classes as of the spring of each school year. This involvement of parents in terms of school visits may have been facilitated by the fact that 45 percent of the schools had established a formal program for school visitations by parents, and an additional 50 percent allowed such visitations on an informal basis (Exhibit 5.27).

Exhibit 5.26
School Visitations by Parents Prior to the Beginning of the School Year
(*N* = 44)



Source: Kindergarten Principal Interview

Exhibit 5.27
Formality of Arrangements for School Visits by Parents of Entering Kindergartners
(*N* = 44)



Source: Kindergarten Principal Interview

Parent Involvement

The proportions of parents who became actively involved with the school increased significantly from prekindergarten to kindergarten in only two areas: participation in teacher-parent conferences and in school-sponsored social events (Exhibit 5.28). Looked at another way, we see that the average frequency of formal meetings and informal conversations between teachers and parents declined from prekindergarten to kindergarten: formal meetings involving most of a class's parents decreased from several times a year to only once or twice a year, and informal contact on an almost daily basis shifted to less frequent contact (Exhibit 5.29) demonstrating the positive influence of Chapter 1. What we do not know from these findings is the extent to which kindergarten teachers had contact with the parents of children having particular difficulties in school or at home.

Supplemental Services

Beyond transition activities meant to enhance the continuity of classroom experience, the transition process also involves the maintenance of a continuous and integrated array of comprehensive services for children and their families. Findings from the prekindergarten and kindergarten principal interviews offered a limited picture of the extent to which comprehensive services were available to children and families.[1] Approximately three-quarters of teachers (75 percent of the Chapter 1 prekindergarten teachers and 73 percent of the receiving kindergarten teachers) reported that they obtained information about the social service needs or other needs of families each year, although we have no data on how this information was used (Exhibit 5.30). Almost all Chapter 1-funded prekindergarten programs provided testing to diagnose psychological problems or developmental delays (97 percent offered testing for cognitive development, 77

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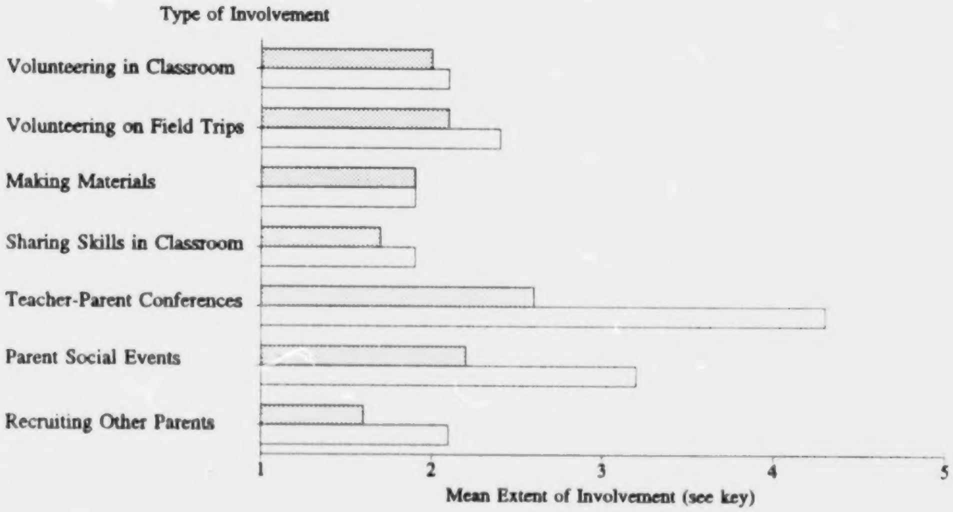
[1] The supplemental services available through the Chapter 1 prekindergarten program and the kindergarten program cannot be directly compared because the principal interviews for the two years used different response categories.

Exhibit 5.28
Extent of Parent Involvement by Type of Involvement



Sources: Prekindergarten and Kindergarten Teacher Interviews

KEY:

▨ Chapter 1-funded Prekindergartens (*N* varied from 29 to 48)

☐ Kindergartens (*N* varied from 29 to 48)

1 = no parents
2 = 25% of parents
3 = 50% of parents
4 = 75% of parents
5 = 100% of parents

Exhibit 5.29
Teacher Contact with Parents/Guardians

Contact	Prek[1]	Kdg[2]
Frequency of Formal Meetings with Most Parents		
Weekly	0%	0%
More than monthly	2	2
Monthly	4	0
Several times a year	52	31
Once or twice a year	43	65
Never	0	2
Frequency of Talking Informally with Most Parents		
Daily	58%	23%
Several times a week	13	21
Weekly	9	10
More than monthly	7	17
Monthly	5	6
Several times a year	4	10
Once or twice a year	4	10
Never	0	2
Keep Notes From Conferences with Parents	87%	90%

[1] *N* varied from 54 to 55
[2] *N* = 48

Sources: Prekindergarten and Kindergarten Teacher Interviews

percent offered psychological testing, and 62 percent offered testing for social development) and offered hearing, speech and vision testing (85 percent). Less than half (44 percent) provided dental exams, and only a third (33 percent) provided physical exams.

During the kindergarten year, 86 percent of the sample children's schools provided or arranged for counseling and mental health services; 75 percent provided or arranged for health services (unspecified); 66 percent provided or arranged for substance abuse counseling; and 59 percent provided or arranged for help related to social services, such as AFDC benefits. Nutrition services were provided or arranged for less frequently by the schools (45 percent).

Exhibit 5.30
Supplemental Services Available to Children and Families

Chapter 1-Funded Prekindergartens	**Percentage**[1]
Teachers Obtain Information About Families' Social Needs or Other Kinds of Needs	75%
School Provides the Following Services:[2]	
Testing for cognitive development	97%
Hearing, speech, vision testing	85
Psychological testing	77
Testing for social development	62
Dental exams	44
Physical exams	33
Kindergartens	**Percentage**[3]
Teachers Obtain Information About Families' Social Needs or Other Kinds of Needs	73%
Chapter 1 Services Available	90%
School Provides or Arranges the Following Services:[2]	
Counseling or mental health services	86%
Health services	75
Substance abuse counseling	66
Social services such as help with AFDC benefits	59
Nutrition services	45
Other services (not specified)	11

[1] *R*espondents checked all that applied
[2] *N* varied from 39 to 55
[3] *N* varied from 44 to 48

Sources: Prekindergarten and Kindergarten Teacher Interviews; Prekindergarten and Kindergarten Principal Interviews; child background information collected with CBRS

Almost all of the sample children (90 percent) were enrolled in kindergarten classrooms in which Chapter 1-funded services were available to them.[2] Of those children, only a third had received Chapter 1 services at some point during the school year; 5 percent had received special education or related services; and 9 percent had received some other type of special service (e.g., ESL, services of a social worker).

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[2] Remember that sample children enrolled in prekindergarten classrooms that were funded all or in part with Chapter 1 funds were not necessarily Chapter 1-eligible—their "slot" in the classroom may have been funded by another source.

CHAPTER SIX

CONCLUSIONS AND IMPLICATIONS

This concluding chapter extracts major themes from findings presented earlier in the report. We first discuss implications of the Chapter 1 substudy findings for early childhood policy and practice. Building on conclusions that were presented in Volume I, we then discuss methodological and research implications of these findings.

Implications for Policy and Practice

The Chapter 1 substudy focused on examining relationships between Chapter 1-funded prekindergarten environments and children's cognitive and social-emotional development. The substudy also provided the opportunity to describe how the programmatic experiences of children changed from prekindergarten to kindergarten.

Characteristics of Enrolled Children

Chapter 1-funded prekindergarten programs enrolled a diverse group of four-year-olds. We saw variation among school districts and sites in terms of the characteristics of children and their families, although on average, the children enrolled in these programs could not be characterized as high risk for school failure due to environmental factors. Overall, we saw that children had a low rate of absence from school, a small percentage of children resided with someone other than their mother during the school year, few came from families in which the mother was below the age of 18 when she had her first child, and parents generally had at least a high school diploma or GED. Comparing the background characteristics of children enrolled in Chapter 1-funded prekindergarten classrooms to the main study sample classrooms (i.e., Head Start, community-based day-care centers, and school-based programs), however, we saw that on average, they were not distinguishable in terms of the estimated incidence of a number of potential risk factors: having a father absent from home, the presence in the classroom of children whose first language was not English, the presence of diagnosed and undiagnosed developmental delays or problems, having a substance-abusing parent, being from a migrant or recent immigrant family, being from a homeless family, or the presence of children living apart from their birth mother. This lack of variation overall, however, may mask local differences by site or community. The key policy issue for states and local communities faced with a mix of early childhood programs and funding sources remains: how to use categorical funding sources to best advantage in order to meet the needs of all young children and their families in a way that does not segregate them by categorical funding stream, particularly when we see differences in program quality by sponsoring organization.

Overall Quality of Prekindergarten and Kindergarten Programs

The overall level of classroom quality was assessed in terms of developmental appropriateness (according to NAEYC guidelines); standards of safety and health; scheduling, curriculum, interaction, and individualization; and the emotional tone of the teacher. In general, the Chapter 1-funded classrooms were of acceptable to good quality. There were very few Chapter 1-funded prekindergarten classrooms that could be characterized as poor quality; where they existed, they were scattered across sites and school districts. More importantly, a number of commonly expressed concerns about school-based prekindergarten programs did not materialize. We found that:

- staff were highly educated and had backgrounds in early childhood; and
- there was strong evidence of parent involvement.

While Chapter 1-funded classrooms tended to have higher average quality ratings than did community-based child-care centers sampled as part of the main study, they were much less likely than were community-based centers to operate full-day programs. The decision to offer full-day or half-day programming is a local decision, influenced heavily by the availability of resources and the mission of the sponsoring organization. Such configurations of higher- versus lower-quality and half- versus full-day sessions illustrates the fragmentation of early childhood education in our communities. Such configurations of available services may place parents in the position of having to sacrifice quality of programming in favor of full-day services in order to enter the job market or an employment training program.

Classroom Characteristics and Dynamics

A number of classroom characteristics and dynamics of the Chapter 1-funded prekindergarten classrooms parallel findings that emerged in Volume I. These findings suggest areas where programs need to concentrate their improvement efforts in order to maximize resources for serving children most in need. Specifically,

Activities and grouping arrangements. The typical day in a Chapter 1-funded classroom contained many types of activities. About one-quarter of the time was taken up with daily routine activities such as arrival and set-up, preparation for departing, lunch and snacks, and transitions between activities. Another one-third of the time was spent in goal-directed activities (a composite of activities that included math/language-related; science/natural world; sewing, woodworking, and cooking; block construction; table games and puzzles; and looking at books) and exploration activities such as sand/water play and dramatic/fantasy play. The majority of time, these activities took place in small groups of two to four children, with the remainder of the time divided about evenly between whole class and individual activity.[1] However, some activities that we would expect as part of the core curriculum did not occur on a daily basis in approximately one out of seven classrooms: math/language-related, science and the natural world, and block construction; sand/water play did not occur in closer to one out of two classrooms. Similarly, the use of a large group arrangement (seven or more children per group) for goal-directed activities more than one-quarter of the time did not promote the "rich play" among peers that is typically associated with these activities.

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[1] The amount of free time or free choice that children had among activities is not reflected in the grouping arrangements.

Interactions. Classroom staff, including teachers and assistant teachers/aides, actively interacted with children more than half of the time. Looking more closely at this interaction, we saw that the largest proportion of this time was spent with the group as a whole rather than in interactions with small groups of children or individual children. Looking at interaction from the point of view of children, we saw that they spent over half of their time not interacting with peers or adults—either spending time alone or in a teacher-led group. These patterns of interaction also suggest that classrooms were not organized to offer children many opportunities for nonteacher led social interaction among peers.

Transitions from prekindergarten to kindergarten. Looking at study data from prekindergarten to kindergarten, we saw that as a group, three-quarters or more of the Chapter 1-funded prekindergarten classrooms and teachers were rated above the midscale of a global quality measure, but never more than 60 percent of the kindergarten classrooms and teachers were rated so favorably. From the point of view of individual sample children, we saw that most of their transition experiences involved moving from higher quality prekindergarten classrooms to kindergarten classrooms that ranged in quality. In terms of average observed child/staff ratios, children moved from prekindergartens that averaged fewer than 10 children per adult to kindergarten classrooms of much lower quality in terms of ratio, averaging approximately 17 children per adult (NAEYC guidelines recommend ratios of 8:1 to 10:1 for five-year-olds, depending upon group size, and 10:1 to 12:1 for six- to eight-year-olds).

We also saw little evidence to indicate that operating prekindergarten programs under the auspices of the public schools made a significant difference in the prevalence of two types of activities to enhance the transition of children from prekindergarten to kindergarten—those that involve coordination or communication between school and preschool levels and those that include parents as active participants in the process. The wide dispersion of the original sample of children from 55 Chapter 1-funded prekindergarten classrooms located in 49 buildings to approximately 222 kindergarten classrooms located in 84 buildings underscores the complexity of the policy issue when public schools seek to enhance the transition and continuity of experience for children. Consistent with recent findings from the *National Transition Study* (Love, Logue, Trudeau, & Thayer, 1992), we saw that:

- few schools that received sample children reported having a formal written school policy related to continuity;
- the majority of kindergarten teachers received at least some information about some entering children, but the typical approach appeared to involve communication between teachers only when children were having adjustment problems;
- schools most frequently informed parents of entering students about their rights and responsibilities in the school; made provisions for welcoming incoming children and their parents with special orientations and visitations; and took steps to involve parents in classroom activities designed to facilitate a smooth transition (e.g., visitations to the new school by incoming children and parents); and
- the proportions of parents who became actively involved with the school increased from prekindergarten to kindergarten in terms of participation in teacher/parent conferences and in school-sponsored social events; the average frequency of formal meetings and informal conversations between teachers and parents, however, declined from prekindergarten to kindergarten.

Two types of activities related to coordination among preschool and kindergarten programs and teachers were found to occur to a greater degree in the school buildings housing kindergartens that enrolled sample children than in the nation's schools as a whole (Love, et al., 1992):

- school principals were much less likely to indicate that the prekindergarten and kindergarten curricula were independent (20 percent versus 49 percent of the nation's schools); and
- a larger percentage of prekindergarten staff participated in joint workshops with school staff on such issues as curriculum and child development.

These findings, taken together with the configurations of higher- versus lower-quality and half- versus full-day services that emerged when the characteristics of the Chapter 1-funded classrooms were compared to the main study sample, suggest a role for Chapter 1 in services of young children from low income families. First, school districts seeking to become a partner in the development of an early childhood system of education and care that comprehensively maximizes readiness for school must take a careful look across the mix of existing prekindergarten providers in their community in order to determine if, in fact, additional early childhood programs are needed. Rather than establishing a "free-standing" Chapter 1-funded prekindergarten program, it may be more efficient for the school district to support "slots" for children in existing prekindergarten programs or to work cooperatively to expand existing half-day prekindergarten programs to be full-day.

Second, the current practice of using Chapter 1 funds to extend half-day kindergarten programs to be full-day programs for eligible children may not serve to maximize the gains made by children in higher quality prekindergarten programs. Chapter 1 funds might better be used to enhance the quality of the kindergarten program by funding staff positions to reduce the child/staff ratio in kindergarten classrooms enrolling concentrations of Chapter 1-eligible children and by addressing issues related to the overall quality of the kindergarten program and the transition of children from prekindergarten to kindergarten. Efforts to further enhance the coordination and communication between prekindergarten and kindergarten programs and staff would permit them to begin to explore (a) the dynamics of quality early childhood programs in terms of classroom activities, grouping arrangements, and interactions; and (b) how these elements are established and sustained from year-to-year.

Relating Classroom Characteristics and Processes to Outcomes for Children

Our analysis of the relationships between classroom environments and children's cognitive and social-emotional development was limited by the relative lack of variation among Chapter 1-funded classroom environments on many of the variables of interest. The global ratings of classroom quality, in particular, demonstrated that most of the sample classrooms were at least adequate—but did little to predict child outcomes in these classrooms beyond child engagement in tasks and their distractibility.

The correlational analyses, considering the relationship of selected classroom dynamics to child outcomes, represent a step toward a more refined view of quality. At first glance, however, we saw that the effects of classroom activities, grouping arrangements, and teacher interactions were confounded. For example, the effect of average child/staff ratios could not be looked at without considering grouping arrangements and interactions associated with classrooms with more or less children per adult. The complexity of our analysis task was further magnified by our conception of child outcomes in terms of teachers' perceptions of child competence and a more dynamic assessment of classroom interactions and learning strategies. The Bronson Social and Task Skills Profile allowed us to look beyond more static measures of cognitive achievement to information processing models (emphasizing goal-orientation and organizational skills for the development of competence) that some researchers have found to be related to later school success (e.g., Bronson, Pierson, & Tivnan, 1984; Brown & DeLoache, 1978; Bruner, 1986; Casey, Bronson, Tivnan, Riley, & Spenciner, 1991; Kreitler & Kreitler, 1987a, 1987b).

The picture that emerges is a complex one in terms of the effect of teacher interaction. Clearly there was a role for teacher guidance and support of children in their activities. A challenge for teachers may involve being able to gauge this guidance and support so as not to inhibit the independent task organizing and planning strategies of children or their organizing strategies with peers.

In terms of teacher interaction, short-term cognitive gains were associated with the proportion of time that teachers focused on cognitive concepts; the proportion of time that teachers spent in teaching and management (and specifically teaching) was positively related to the proportion of time spent in tasks with goals and tasks completed successfully. At the same time, children were less likely to engage in social interaction with their peers and more likely to be distracted in classrooms in which teachers spent more time teaching and focused on cognitive concepts. Children on average were more likely to use verbal means to influence peers when teachers spent more time teaching and when this teaching focused on cognitive concepts, suggesting that although there was less peer social interaction in these classrooms, it was at a higher developmental level when it occurred. Running through these findings was a pervasive pattern of the positive effects of teacher warmth and responsiveness (e.g., speaking warmly, listening attentively, explaining reasons for rule infractions, encouraging enthusiastic, positive attention to children as individuals, talking to children on a level they understand and bending or kneeling to establish eye contact), and their use of positive interaction techniques (e.g., explaining, questioning, praising, and singing) on short-term cognitive achievement and the task-related behaviors of children.

While the concept of goal-directed activities (involving a composite of activities throughout to produce "rich play") was appealing, it was the time spent in math/language-related activities (broadly defined to include, for example, a counting song) that contributed to their short-term cognitive achievement and their performance as measured by teacher ratings. These findings, however, only tell half the story since so little time in these classrooms was spent in dramatic and fantasy play, block construction, as well as other exploratory activities such as sand and water play. We were unable to test the hypothesis that radically different proportions of time spent in these classroom activities would be associated with either mastery or social outcomes for children.

Implications for Research

This study represents the first exploration devoted to Chapter 1's role in early childhood education. The substudy looked beyond more global measures of classroom quality to examine some of the dynamics and processes thought to be associated with outcomes for children enrolled in Chapter 1-funded prekindergarten classrooms. Our conception of desired outcomes for children moved beyond more static measures of cognitive achievement to consider the social and mastery task behaviors of young children in classroom situations. Although the substudy was not able to investigate the relationship of discontinuity of experience to outcomes for children, it took a first step by comparing the quality of experience from prekindergarten to kindergarten. Each of these areas deserves further research that is focused on:

- systematically looking at classroom dynamics, considering the activities, grouping arrangements, and interactions among staff and children, that distinguish high quality programs from those that may be defined as "adequate" with an emphasis on examining what works best for particular types of children;
- examining the relationship of the goal-orientation and organizational skills of young children to later school success; and
- examining how discontinuity between prekindergarten and kindergarten affects young children's development and school success, and the differential effects of various approaches to transition.

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APPENDIX A:
The Use of Chapter 1 Funds in Prekindergarten

PARTICIPATION IN CHAPTER 1 PREKINDERGARTEN PROGRAMS IN THE UNITED STATES

The original Chapter 1 substudy design called for selecting 25 programs located in five sites (two classrooms per program enrolling a total of approximately 750 children) that were also used in the Mathematica Policy Research, Inc. study, *A Profile of Child Care Settings: Early Education and Care in 1990* (Kisker, Hofferth, Phillips, & Farquhar, 1991). This was not possible because of the small proportion of school-based programs in that sample (17 percent) and the fact that most of the school-based programs sampled were not Chapter 1-funded prekindergartens. During fiscal years 1986, 1987, and 1988, public school participation in Chapter 1-funded prekindergartens represented only one percent of the overall Chapter 1 enrollment in the United States (Sinclair & Gutmann, 1990): approximately 61,300 children in 1985-86, 57,200 in 1986-87, and 68,200 in 1987-88.

To identify eligible sites for the Chapter 1 substudy, we made telephone calls to state Chapter 1 directors in the 17 states that had more than 1,000 prekindergarten children receiving Chapter 1 services and obtained the names of local school districts using Chapter 1 funds in programs for 4-year-olds. We then grouped these local school districts by county in order to identify primary sampling units (PSUs) in which at least 150 prekindergarten children were served through Chapter 1. Sixty-two PSUs meeting this criterion were then compared with counties sampled in the MPR study; a total of 18 PSUs also appeared on MPR's sample list (refer to Exhibit A.1). These PSUs were then used to select a set of five sites and five alternates. In order to obtain sufficient numbers of programs (that were school-based and that met four or more days per week) and children, it eventually became necessary to recruit school districts located in counties contiguous to the county originally selected in three of the five sites.

EXHIBIT A.1
Chapter 1 Substudy Sampling Frame

State	1987-88 PreK Enrollment in Chapter 1	Number of Counties with 150+ children in Chapter 1 PreK	Number of Counties in MPR Sample
California	2,574	5	1
Colorado	1,211	2	1
Connecticut	2,305	3	1
Florida	1,640	6	2
Illinois	4,228	1	1
Louisiana	2,595	6	0
Maryland	2,980	2	0
Massachusetts	1,621	3	2
Michigan	7,035	2	2
Missouri	2,076	3	0
New Jersey	3,107	6	1
New York	5,503	3	1
Ohio	3,085	2	2
South Carolina	1,286	3	0
Texas	15,912	3	3
Virginia	1,457	6	1
Wisconsin	3,313	6	0

APPENDIX B:
Revised Design for the Kindergarten Year of the Chapter 1 Substudy

REVISED DESIGN FOR THE KINDERGARTEN YEAR OF THE CHAPTER 1 SUBSTUDY

Synopsis

This appendix presents the background and rationale for our recommendation that data collection during the kindergarten year of the Chapter 1 substudy focus on questions relating to understanding the nature of children's kindergarten experience and of the programmatic continuities and discontinuities that exist between their preschool and kindergarten years. We did not conduct a full study of the relationships between measures of the kindergarten classroom environment and child outcomes because we believed that the likely effects (according to projections based on our prekindergarten data) would be too small to be detected given the statistical power available for our analyses. Instead, we obtained PPVT and CBRS data on a sample of kindergarten children, as discussed on page B-6.

From the 222 kindergarten classes into which our prekindergarten sample moved, we selected a representative sample of 48 across 14 school districts in four sites. Data collectors spent two days in each classroom observing elements of the classroom environment with a subset of the main study instruments used during the preschool year. We expected the following benefits to the Department of Education to result from this modification in the design:

- We would provide rich descriptions of the kindergarten experiences of children who had been in Chapter 1-funded prekindergartens; some of the kindergarten classrooms will be those providing Chapter 1 services.
- We would measure continuity and discontinuity between a wide variety of prekindergarten settings and a wide variety of kindergarten programs.
- The findings would be presented within the context of each program's community and school district. (This context information was obtained early in the children's prekindergarten year.)
- The teacher/administrator interviews obtained in the prekindergarten year would be repeated during kindergarten to learn how children are guided through the transition process.
- This study would build on findings and issues from the *National Transition Study* that RMC Research conducted for the Department.

- In addition to learning about curricular continuity (based on classroom observations) experienced by children from Chapter 1-funded prekindergartens, we would learn more about the issues of philosophical and structural continuity (through our interviews).

- By collecting child-level data in kindergarten on a small sample of children from the preschool sample, we could compare the kindergarten PPVT and CBRS performance of children to their cognitive, social, and mastery task competency outcomes in preschool, addressing the issue of stability of outcomes.

Background

The Chapter 1 substudy was designed to address three key questions:

1. How are children's experiences and caregiver practices related to cognitive and social-emotional outcomes for children enrolled in Chapter 1 preschool programs?
    a. What are the relationships between children's experiences and caregiver practice and outcomes when children's family background is taken into consideration?
    b. How do these relationships vary for different outcomes?
    c. How stable are these outcomes for children from preschool to kindergarten?
2. How do the educational experiences of children enrolled in Chapter 1 programs change from preschool to kindergarten?
    a. What discontinuities do children experience?
    b. Are there relationships between discontinuities that children experience and outcomes in kindergarten?
    c. How are children guided through the transition process?
3. For Chapter 1 preschool programs, can we begin to specify a range of acceptable quality variables based on the relationship between the potential quality indicators and outcomes for children enrolled in Chapter 1 preschool programs?

The Preschool Year of the Chapter 1 Study

Study Questions 1, 1a, 1b, and 3 required analyses based solely on the data collected during the preschool year—data that we had already collected and analyzed (both classroom environment data and child performance data). Question 1c and all parts of Question 2 required environment data and child performance data). Question 1c and all parts of Question 2 required that a substantial sample of children and their classrooms be assessed and observed in preschool and again in kindergarten. Toward this end, we established baseline data (family background information, cognitive achievement, social and mastery task competence) in the fall of the preschool year for 783 children in 55 classrooms across 16 school districts. A total of 677 children were followed and have at least fall and spring PSI scores. (586 were assessed with the complete battery, including the Bronson child observation instrument.) At the same time, observers documented a wide array of these children's classroom experiences including aspects of the classroom structure, classroom dynamics, and teacher and child behavior.

We completed analyses of children's cognitive achievement and social and task competence, assessed the relations among these outcome domains, and evaluated changes from fall to spring of the preschool year (see *Volume III: Technical Appendices*). Abt Associates completed analyses of the classroom environment variables and we completed extensive analyses to help us understand relations between the classroom variables and the child outcome measures (addressing Study Questions 1, 1a, 1b, and 3).

Plans for the Kindergarten Year

To answer Question 2b, we would need to follow a sizeable sample of children into their kindergarten classes. Upon contacting the 16 participating school districts during fall 1991, we learned that although the schools could locate 81 percent of the children assessed in spring 1991, the children were dispersed across 222 kindergarten classrooms. There were four or more children from our prekindergarten sample in only 44 of these classrooms; there were 66 classes with three or more children. (This does not include the San Francisco School District, which could not locate 69 percent of their prekindergarten sample.)

Based on an analysis of the number of classrooms and children per classroom that we could expect to have in kindergarten, it appeared there was not sufficient statistical power to detect the kinds of relationships and effects that we could expect to observe with respect to the question about the impact of classroom experience on child outcomes. These "power analyses" were computed based on prekindergarten data that paralleled the analyses we planned to do with the kindergarten data and consultation with one of the authors of the statistical package, Hierarchical Linear Modeling (HLM). These analyses and our conclusions are reported and discussed more fully at the end of this appendix.

These considerations led us to the recommendation that we not expend resources assessing children's development in kindergarten as originally planned. This recommendation was accepted, so we addressed Study Question 1c in a minimal way (see below), such that data collection during the kindergarten year and subsequent analyses focused on Study Question 2.

Answering Study Question 2 required data from the kindergarten programs, but did not require that we follow and assess individual children. Rather, we were able to address questions about transition and continuity/discontinuity by assessing the kindergarten classrooms into which children from Chapter 1 preschools go, comparing the kindergarten and preschool experiences to learn about the continuities and discontinuities children experience, and obtaining information from teachers, principals, and other school staff to determine whether (and how) children are guided through the transition process. These investigations enabled us to address Study Questions 2, 2a, and 2c. Without child outcome data on a large sample of children and classrooms, however, we could not go the next step of ascertaining the relationship between discontinuities and kindergarten outcomes.[1]

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[1] Although we could begin to address this issue by testing new (non-sample) children in kindergarten, unless we had data on children's levels of performance at the beginning of, or prior to, kindergarten, we would not be able to attribute levels of children's kindergarten performance to discontinuity.

Kindergarten Study Design

An appropriate design for addressing Study Question 2 entailed defining the universe of programs to which we wanted to generalize and selecting a sample of the kindergarten programs. Taking the prekindergarten sample of 55 classrooms in 16 districts as the population to which we wanted to generalize, we can describe this universe as children who have experienced a Chapter 1-funded preschool program. Our interest, then, was in describing the transitions and kindergarten experiences of this population of children. Because we would not be relating the kindergarten experience to child outcomes, it was not necessary to restrict the sample of kindergarten classes to those with some minimum number of sample children. As long as a kindergarten class in one of these districts had at least one sample child we could define a *possible* prekindergarten-kindergarten transition for children from Chapter 1-funded prekindergartens.

Because the California site would provide only a very small sample of kindergarten classrooms, the design was carried out at the remaining four sites: Michigan, Texas, Florida, and New Jersey. We selected 12 classrooms from each site using the following criteria: maximize diversity of classrooms by selecting only one class per teacher (in cases where a teacher may have two half-day classes) and select classes from as many different school buildings as possible. Following these criteria, we were able to select a kindergarten sample of 48 classes in 46 schools.

Testing Children in Kindergarten

For reasons outlined earlier, we limited child outcome testing to children in the 48 kindergarten classrooms who were already in our preschool sample. This allowed us to assess the predictive stability of the prekindergarten performance measures (PSI, CBRS, and Bronson variables) in relation to kindergarten performance, thereby enhancing our understanding of the prekindergarten findings. We determined that we could conduct meaningful analyses with as few as 100 children, and so the 131 children in the 48 classrooms were sufficient. We then analyzed the extent to which PSI, CBRS, and Bronson performance in preschool was predictive of kindergarten performance (CBRS and PPVT). Because we had extensive information about the community, district, school, and classroom environments of these children, it may be useful to the Department to follow this sample as part of the national longitudinal study of Chapter 1 (Prospects).

Statistical Power Analysis

The purpose of conducting a power analysis was to determine if contemplated study designs for a Chapter 1 prekindergarten-to-kindergarten follow-up involving 44 and 64 classrooms (226 and 286 children, respectively) were powerful enough for detecting classroom effects of varying magnitudes. The design with 44 classrooms had an average class size of 4.7 children, while the average class size in the design with 64 classrooms was 4.0.[2] An illustrative analysis was conducted to determine the power associated with the size of the effect of the classroom variable ECERAV (average ECERS score) on PSI scores relative to the classroom standard deviation on ECERAV.[3] The question addressed here is: If one could increase ECERAV, what minimum increase would produce a meaningful increase in PSI scores (after adjusting for prior ability measured by fall PSI)?

Power is generally defined as the probability of rejecting a false null hypothesis (given that some alternative hypothesis is true). In other words, power gives an indication of the probability that a study design will detect an effect of a given magnitude, provided that the effect exists. The power analysis does not indicate that a design will actually produce an effect of a given magnitude. Empirical effects are dependent on the strength of the relationship between the independent variable in question and the outcome measure of the study.

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[2] In conducting the power analysis, the harmonic means were used to control for extreme values of class size. The arithmetic means were 5.07 for the 44 classroom design and 4.42 for the design with 64 classrooms.

[3] ECERS, or the Early Childhood Environment Rating Scale, provides a global index of the quality of programming. Parallel analyses were conducted for the classroom variables measuring teacher responsiveness and average child/staff ratio with similar results.

We addressed the question of power by considering two alternative scenarios. The first scenario represents an idealized situation in terms of what we would hope to find, while the second scenario represents a more realistic situation in terms of what we would expect to find. In the first scenario, let us suppose that children in classrooms with a one unit standard deviation increase on ECERAV (.71) correspondingly increase their scores by .86 points on the spring PSI beyond what would be expected given their scores on the fall PSI. This increase corresponds to a moderate to large standardized effect size of .5 (see the row in Exhibit B.1 where beta = .5), which we could categorize as educationally meaningful.[4] The prekindergarten design with 55 classrooms (number of children = 677, average class size = 11.5) gives us .998 power to detect a significant effect of that magnitude. In other words, over 99 out of 100 times we would be correct in deciding to reject the null hypothesis ($b = 0$) given that an effect size of this magnitude exists. In turn, the proposed kindergarten designs of 44 ($N = 226$) and 64 ($N = 286$) classrooms would give us power of .96 and .95 respectively to detect a significant effect of that magnitude. In other words, 95 out of 100 times we would be correct in deciding to reject the null hypothesis ($b = 0$) given that an effect size of this magnitude exists.

In the second scenario, however, suppose the reality is that differences in classroom practices as measured by an increase of one standard deviation on ECERAV only produce a gain of .34 points on the spring PSI after adjusting for the fall score.[5] This increase corresponds to a small standardized effect size of .2 (see the row in Exhibit B.1 where beta = .2). The power of the prekindergarten design to detect an effect that small drops to .48. In the case of the two kindergarten designs, the power drops to .31 for 44 classrooms and .30 for 64 classrooms, meaning that seven out of ten times we would be wrong to reject the null hypothesis given that an effect of that magnitude exists.

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[4] An effect size is defined here as the degree to which a phenomenon is present in the population. More specifically, it represents the degree to which the null hypothesis (no effect) is false (see Cohen, 1977 for further details). For the purposes of this particular power analysis, an effect size is measured by a standardized regression coefficient (beta).

[5] Based on our analyses of classrooms and children at the prekindergarten level, we found a correspondingly small effect for ECERAV on the spring PSI score. We caution, however, that expectations about effect sizes not be guided solely by sample-specific results.

Thus, we see that in the first scenario representing an idealized situation we would have more than sufficient power to detect effects producing educationally meaningful increases on the PSI. On the other hand, in the second scenario representing perhaps a more realistic version of sample classrooms, our proposed designs are not powerful enough to detect effect sizes so small. In short, although we are confident in our ability to detect educationally meaningful effects, our power suffers appreciably for detecting effects that are more realistic.

The above findings can be extended to other types of designs as well. In a design using, for example, only aggregate-level data, we could investigate the effects of classroom variables on mean class achievement with respectively 44 and 64 degrees of freedom. In this design, however, the precision of our estimates and consequently our power would decrease. The multilevel HLM analysis, on the other hand, employs the individual-level measure of prior ability that acts as a powerful covariate in explaining both within- and between-classroom variation on the outcome variable. Thus, the ability to use individual-level covariates in a multilevel design results in producing more precise estimates and a more powerful analysis compared to traditional designs using solely aggregate-level data.

Exhibit B.1
Power Analysis Summary Table[6]

beta	*b*	Power ($J = 55$)	Power ($J = 44$)	Power ($J = 64$)	Adjusted PSI Gain
0.1	.24	.15	.11	.10	.17
0.2	.48	.48	.31	.30	.34
0.3	.73	.82	.61	.58	.52
0.4	.97	.97	.85	.83	.69
0.5	1.21	.998	.96	.95	.86
0.6	1.45	.999	.99	.99	1.03
0.7	1.70	.999	.999	.999	1.20

Key:

beta:	standardized regression effect (effect size)
b:	raw regression effect
Adjusted PSI Gain:	Adjusted increase on PSI (controlling for fall PSI) associated with a one standard deviation increase on ECERAV
J:	Number of classrooms

[6] All power estimates were computed using a two-tailed test, $p = .05$.

APPENDIX C:
Issues Related to the Bronson Social and Task Skills Profile

ISSUES RELATED TO THE BRONSON SOCIAL AND TASK SKILLS PROFILE

Introduction

In this appendix we present selected findings and our current interpretations of a number of issues related to the use of the Bronson Social and Task Skills Profile as a child measure. Key issues that are discussed include:

- our rationale for the use of the Bronson and theoretical constructs that are used by the instrument's developer to describe it, including a discussion of current issues related to its use as a child measure in the Chapter 1 substudy;
- a refinement of our terminology in describing the key behaviors of children that are measured by the Bronson and used in subsequent analyses;
- findings regarding the reliability of the Bronson data;
- interpretations of the low intercorrelations among Bronson variables;
- the development of meaningful Bronson variables; and
- findings regarding the predictive validity of the Bronson.

Rationale and Theoretical Constructs

The Need for More Adequate Child Measures

When Raizen and Bobrow of the Rand Corporation reviewed instruments in 1974 for a prospective Head Start evaluation they commented that: "In area after area of child development, as we examine which outcomes are important and which outcomes we can assess with some degree of confidence, we find an almost inverse relationship" (Raizen & Bobrow, 1974a, p. 17). Although the deficit was most acute in the social and emotional areas of functioning (Smith & Bissell, 1970; Walker, 1974; Walker, Bane, & Bryk, 1973), many psychologists even criticized the available cognitive measures (Anastasi, 1969, 1988; Bissell, 1973; Butler, 1974; White, 1973). They noted that although psychological tests are most adequate and trustworthy when measuring traditional areas of cognitive development such as IQ and achievement, measures in both of these areas still have many difficulties and limitations—especially when used with young children. These criticisms are echoed in more recent reviews (Cunningham, 1989; Meisels, 1985, 1989).

Cognitive measures (both standardized tests and tests constructed by teachers to determine grades) have also been criticized recently because they do not measure understanding or thinking (Resnick, 1987), and because they do not assess the ability to apply knowledge to real situations (Frederiksen & Collins, 1989; Shepard, 1989). There is a need for cognitive measures that look beyond right and wrong answers to the processes children use in working on problems and tasks and to the effectiveness of these processes in real-world coping and problem-solving situations.

Recent critiques of testing have also noted the problematic link between testing and instruction (Madaus, 1988; Meisels, 1989). Since teachers and schools are often evaluated on the basis of the test scores their students produce, educators have been concerned about the narrowing of educational goals to focus on "teaching to the tests." This problem has been a focus for concern even in early childhood education (Bredekamp, 1987). One proposed solution for this dilemma is to make "tests" resemble real learning tasks (Frederiksen & Collins, 1989; Shepard, 1989; Wiggins; 1989) so that "practicing for and taking the tests actually enhances rather than impedes education" (Wiggins, 1989, p. 41).

Another limitation of existing tests has been that cognitive and social variables have typically been considered in isolation from one another. A number of psychologists and educators from Willard Hartup (1968) and Ed Zigler (1970), to Martin Deutsch (1966) and Barbara Biber (1971) have stressed the *interrelationship* between social-emotional and cognitive factors in development and noted the difficulty of separating cognitive development from personality, motivation and affect. Day and Berlyne (1971) proposed that only about half of the variability in school achievement can be accounted for by intelligence or IQ factors and that the next most potent factor is probably motivation. Other theorists and researchers (McClelland, 1973; Sontag, Baker, & Nelson, 1958; Wechsler, 1943, 1950; Zigler & Butterfield, 1968) have also emphasized the importance of motivation in cognitive or "intelligent" performance. More recently, those concerned with young children have been especially insistent that we consider the "whole child" in any program of education or evaluation. Many (Anderson & Messick, 1974; Scarr, 1981; Zigler & Seitz, 1980; Zigler & Trickett, 1978) have stressed the importance of focusing in particular on *social or functional competence* which includes cognitive, social, and motivational components.

Getzels and Jackson (1963) reported years ago that teachers and parents rate social skills, goal directedness, and emotional stability as more likely to lead to school and life success than variables such as IQ and aptitude. Unfortunately, the absence of a generally accepted theory has hindered the development of measures. Definitions of social-emotional health or competence are often contradictory, vague, or so comprehensive that they seem to include all functioning. Zigler's definition, which was taken as a model for Head Start evaluators in the 1970s is both comprehensive and vague. He suggested that social competence is "a child's everyday effectiveness in dealing with his environment," and then expanded this to: "A child's social competence may be described as his ability to master appropriate formal concepts, to perform well in school, to stay out of trouble with the law and to relate well to adults and other children." This may be true but it provides no focus for evaluators. Anderson and Messick (1974) proposed an even more comprehensive if less vague definition that included 29 diverse components, for example: differentiated self-concept and consolidation of identity; curiosity and exploratory behavior; gross motor skills; creative thinking skills; enjoyment of humor, play, and fantasy. Few, if any, aspects of the child's functioning were left out of this definition, and it too provided no practical guidance for measurement.

Theoretical Constructs Underlying the Bronson Social and Task Skills Profile

The Bronson Social and Task Skills Profile (Bronson, 1975, 1985, 1991) focuses on skills of practical concern to teachers in the classroom and links these with relevant psychological theory and research. It connects teachers' interest in appropriate, focused, and organized goal directed behavior and in the use of appropriate and effective strategies in cognitive and social situations on the one hand, with information processing theory and research on planning and problem solving in children on the other. The rationale behind the observation categories makes use of the concept of "executive control"—found in information processing and neuropsychological models of organized goal-directed behavior—to explain many aspects of competence in both social and cognitive functioning. Information processing models have provided a way of studying the mental processes likely to be involved in complex behavior. People are considered to be in control of their behavior, including their use of strategies stored in long-term memory that are modifiable (Simon, 1972). Executive processes, such as planning and decision making, involve generalized rules for problem solving (Brown & DeLoache, 1978; Siegler, 1986; Sternberg, 1984).

Neuropsychological models of executive functioning have grown largely out of Luria's research (1966, 1973, 1980) on frontal lobe functioning. Frontal lobe injury often leads to the failure to identify a problem as a problem, the failure to investigate the essential features of a problem, and the inability to judge whether a produced outcome matches the initial goal. Without adequate frontal lobe functioning, the information and execution of a program of action is not possible. Das (1980, 1984a, 1984b) and his colleagues (Ashman & Das, 1980; Das & Dash, 1983; Das & Heemsbergan, 1983; Kirby, 1984; Naglieri & Das, 1987, 1988) have examined "intelligence" from an information processing model derived from Luria's conceptualization of brain functioning. They have focused on the processes and strategies involved in planning and performing complex tasks.

Recently, a number of researchers have confirmed the presence of a planning factor in the problem-solving behavior of preschool children (Casey, Bronson, Tivnan, Riley, & Spenciner, 1991; Goodson, 1982; Klahr & Robinson, 1981; Rogoff, Gauvain, & Gardner, 1987; Wellman, Fabricius, & Sophian, 1985). Others have suggested a developmental progression in the ability to plan (DeLisi, 1987; Fabricius, 1988; Gauvain & Rogoff, 1989; Kreitler & Kreitler, 1987a, 1987b; Pea, 1982; Rogoff, Gauvain, & Gardner, 1987; Wellman, Fabricius, & Sophian, 1985; Wellman, Somerville, Revelle, Haake, & Sophian, 1984).

An information processing model of skill or competence provides a framework that can encompass all organized, goal-directed behavior—both cognitive and social. Skill in either area of functioning can be considered the result of effective *strategies and plans*. This approach can bring order out of great laundry lists of desirable and undesirable behaviors by suggesting the importance of *underlying organizational skills.*

This view of the basic processes involved in competence provides a way of establishing priorities in looking at behaviors in any area of interest. A top priority in either social or mastery task behaviors, for instance, becomes the *level of organization* of the activity, with aimless wandering or random undirected behavior at the low end of competence in either case. Another priority in either social or cognitive task behaviors becomes the *selection of appropriate goals* and the *use of appropriate strategies* to achieve these goals. Persistence in pursuing selected goals provides a measure of motivation, and success in reaching social or mastery task goals gives another important measure of skill.

From the information processing perspective, competence in ongoing behavior can be considered to involve "executive" or *organizing skills* much like a good program in a computer. These organizing skills imply:

- skill in *recognizing* the relevant cues and parameters, or rules, of a situation—i.e., knowing when to use a routine;

- skill in *predicting and planning* possible sequences of events and outcomes of a situation—i.e., knowing how to sequence routines; and

- skill in *organizing and controlling* both the self, and the social or material "other" in a situation in order to effectively reach chosen goals—i.e., effective monitoring and control of an ongoing process.

Selection and Adaptation of the Bronson Social and Task Skills Profile (1990 Revision)

Although observational measures are expensive in terms of both money and time, this method of assessment was selected for use in the Chapter 1 substudy for three major reasons:

- problems involved in testing young children in a formal test situation;
- the ecological validity of assessing the child's functioning in the natural setting; and
- the complex nature of the skills to be assessed.

The Bronson uses an observational technique with structured observation categories. This allows the assessment of ongoing behavior and the child's strategies for coping with social interactions and mastery tasks in child care, child development programs, or school settings.

The observation categories monitor five key aspects of executive skills:

- the *direction* of spontaneous involvement of a child (involvement in social interaction, a cognitive mastery task, lack of involvement, etc.);
- the *length* of involvement, (fleeting or focused—and the relative amounts of time spent in various types of activities);
- the *level* of involvement (the degree of focus when engaged in tasks and the level of organization in social interactions);
- the *strategies* used during involvement; and
- the *outcome* in terms of the success of a child's efforts.

The categories provide a way of recording a child's performance in planning and organizing work, planning and organizing interactions with others, and successfully carrying out social interactions and learning tasks. The concept of "executive skill" is applied to both social and learning activities with the emphasis on *using effective strategies for choosing and reaching goals.*

The social and cognitive mastery strategies in the instrument were derived from extensive observations of children in natural settings. Any behavioral evidence of appropriate strategic approaches to cognitive or social tasks that could be reliably observed was included in distinct categories (see the descriptions below).

The categories are divided into three target areas for both observation and scoring: the use of time area, the cognitive mastery area, and the social area. In the USE OF TIME area the categories focus on the child's ability to:

- become involved in sustained social activities with others, at an age-appropriate level;
- become involved in sustained mastery activities; and
- avoid lack of involvement or random, undirected activity with objects or people.

In the MASTERY area the categories focus on the child's ability to:

- use appropriate task attack strategies when performing a task;
- follow through on a task—by resisting distraction and persisting in the face of difficulty;
- correct errors or effectively summon help when needed; and
- ultimately, complete tasks successfully.

In the SOCIAL area the categories focus on the child's ability to:

- maintain a level of involvement appropriate to age;
- use effective and appropriate strategies to influence others and reach social goals;
- use language, rather than physical force, to influence or gain the attention of others; and
- control inappropriate impulses and abide by the rules of the setting.

The observation instrument allows the recording of both the frequency and the duration of specific behaviors. Duration is measured with a special timing device or with a stop watch and is measured in 15-second intervals.

The instrument is typically used in the following way. Observers, previously trained to a criterion of at least 90 percent reliability in every category, follow and record the behaviors of a child for ideally six, 10-minute periods. The modified time-sampling procedure requires that three of the observations begin at the start of a social interaction and three begin at the start of a mastery task. In regular classrooms, no more than one or two observations are done on a single day to minimize the influence of atypical behavior periods.

One aspect of the Bronson that influenced its selection for use in the Chapter 1 substudy was its effective use in other early childhood studies. The measure was used as part of an evaluation battery for the Brookline Early Education Project (BEEP) (Bronson, 1981; Bronson, Pierson, & Tivnan, 1984; Pierson, Bronson, Dromey, Swartz, Tivnan, & Walker, 1983) in which children were assessed in preschool, kindergarten, and second grade. Performance on the measure distinguished program children from control groups, and Bronson scores were related both to teacher's assessments of social and cognitive competence and to cognitive test scores. Scores from the kindergarten observations also predicted retention in grades K, 1 or 2, need for special services through grade 2, and California Achievement Test scores at grade 2. The measure did this as well or better than other predictors usually used by the Brookline school system (e.g., mother's education and cognitive test scores upon entering kindergarten).

The mastery categories of the instrument were recently used to evaluate the planning ability of preschool children. Results indicated that young children do use planning in problem-solving, that there are individual differences in the ability to use organizational and systematic strategies when approaching tasks, that planning ability is a separate factor from general intelligence, and that planning is a generalized ability crossing tasks at this age level (Casey, Bronson, Tivnan, Riley, & Spenciner, 1991). In a related study it was found that classroom and teaching differences had an impact on the development of planning in young children (Casey, 1990).

The Bronson instrument was also used in the Early Intervention Collaborative Study (EICS) based at the University of Massachusetts Medical School in Worcester, Massachusetts to assess 200 children who were identified in their first three years as having special needs. Children were then assessed when they entered school at age three and were followed-up longitudinally and observed in their kindergarten classrooms. Differences were found related to disability, parent education, staff/child ratio, classroom interaction (mainstreaming), and the degree of activity choice afforded children (Shonkoff, Hauser-Cram, Krauss, Upshur, Antaki, & Steele, 1992).

Definitions

One challenge to collecting observational data, reporting findings, and interpreting analyses based on this data in a meaningful way involves the operational definition of particular child behaviors. Though we developed operational definitions of each category of behavior to be observed (Bronson, 1991), examples of the classroom situations in which the behavior might be expected to occur help data collectors, data analysts, and readers of our findings/interpretations understand the data within an appropriate context. Thus, for each of the child variables from the Bronson that were used in our analyses, we augmented our operational definition with related examples from the narrative sketches that were actually written by the data collectors at the end of ten-minute classroom-based observations of individual sample children (refer to Exhibits C.1 and C.2).

Reliability of the Bronson Data

In this section we present data for three measures of Bronson reliability. First, we discuss data regarding criterion-related agreement collected both at the end of observer training and near the end of the data collection episode. (Observers independently recorded behaviors of children

Exhibit C.1
Mastery Variables

Variable Definition	Examples
Time in task with a goal: Child engaged in any activity directed primarily at mastering a skill (except a gross motor skill), constructing a product, or completing an academic or perceptual task.	Child is given a picture/letter sound ditto to color according to first letter. All children are working with teacher in identifying the pictures with the sounds. They are given crayons to color as teacher directs. Child begins the task before teacher directs him and at times he waits for her direction. He works independently and completes the task successfully, coloring in the lines and in appropriate colors. Child works on puzzle, completing it correctly with some trial and error. She begins another, and when she has some difficulty with it, tells teacher, "This one is too hard. I need another one." Teacher tells her to try, and she completes it successfully.
Task organizing strategies: Child gathers materials before beginning a task, groups materials according to some clear criterion that is relevant to the task, finds an appropriate work place, lays out materials in an orderly way, and/or checks progress for accuracy.	Child gathers blocks and gets a pattern of a truck to follow. He starts building the truck, gathers more blocks, and tells female peer, "No, I need the long ones," when she tries to get some of them from him. He uses longer blocks and tells her, "Look, I have more blocks." He continues task, goes to gather more blocks several times, returns to task, completes truck successfully, and finally gets a little block person for it. Child working quietly on peg pattern task, spends some time sorting pegs by color before beginning pattern. She is successful at completing one pattern, gets another one, spending less time sorting pegs by color before she begins the pattern. She completes the second one more easily, taking a brief moment to watch peers who are talking loudly.
Task planning strategies: Child shows organizational skills and planning in a task by rule-governed, orderly and sequenced behavior during a task. Behavior is the opposite of either random or trial and error attempts to reach a goal.	Child systematically does the edge pieces of a puzzle before filling in the center. While working on a matching task, child softly verbalizes: "Biggest one next. These are the same. All the red ones go here; then the green ones on top."
Task completed successfully: A child completes a task successfully.	Child matches each set of materials by color and announces: "I'm done." Child stands up and places last block on top of pyramid structure; stands back with arms out-stretched.
Time distracted in mastery: Child's attention wanders from the mastery task (s)he is doing.	Child is working on a peg board with a pattern of a diamond shape inside a square shape in front of her. She follows outside square with no difficulty, but is distracted several times while trying to do the inside shape, saying, "God bless you, God bless you" to male peer next to her, watching him, smiling at him, talking to him, and watching him and teacher interact at different points. Child is in group working on dittos. From the beginning, he looks around and doesn't fill in ditto. Teacher asks, "Did you write your name?" He spells his name incorrectly. Teacher tells children to write letter "q" with their pencils. He starts, but then rolls his pencil around. He skips ahead to the next page and colors carefully, turning page around to get at odd angles. He intermittently looks around the room for 30-45 seconds while coloring.
Time uninvolved: Child not engaged in any clearly focused social activity, non-social activity, or focused watching.	Child successfully finishes a color peg pattern project. He interacts briefly with male peer, watches female peers for a bit, then he simply stands without doing anything. He gets another pattern, works on it briefly, then returns to watching the female peers. Child is working on peg pattern, tries unsuccessfully to get pegs from female peer, completing outside square. When she works on inside square, is incorrect, tries unsuccessfully to get the teacher's help. She tries to place pegs again, but fails. She removes all pegs and plays with them, and then gets another pattern. She gathers pegs and stares at the pattern. She then puts her head on the table totally uninvolved for a long time.

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Exhibit C.2
Social Variables

Variable Definition	Examples
Time in social interaction: Child is engaged in an activity involving interaction with another; includes organized social interaction with roles, social play, cooperative building, true conversation or some other, less structured interaction.	Child tells female peer that she has new shoes. Peer says she has new shoes too. They place their feet together, and child says that hers are bigger.
Time in organized social interaction (strategic): Child is engaged in a complex social interaction with roles or rules, or true conversation involving an exchange of information rather than talking at, or past, another. Does not include unstructured interactions or attempts to influence.	Child is playing with two females peers in loft which is set up like a grocery store. She chooses food and fills shopping basket, then becomes cashier behind the register, handing out money saying: "Be banker." She rings up others' groceries, and watches and directs female peers and male peers while they shop, verbally and demonstrating. Female peers ask prices of particular items.
Organizing strategies with peers: Child suggests play, assigns roles or resources, states rules while interacting with a peer; may be accomplished through verbal, physical, or other means. Strategies may or may not be successful.	Child is playing house with female peer. They share chores; she takes role as mother: "It's time to feed the baby. I'm going to put the baby to sleep. You wash the dishes." She talks on play phone, then continues to put the baby to bed and direct female peer to cook. Child sitting in block area with male peers and says: "All the streets should have signs. You make the signs." Peer ignores him and keeps building road with blocks.
Accommodating strategies with peers: A child is able to solve a social problem or dispute about roles or resources by spontaneously sharing, trading, or taking turns with a peer or agreeing (without resistance) to share, trade, or take turns. Strategies may or may not be successful.	Child asks to have a turn on a large wheeled vehicle and female peer agrees. Child does not have enough Legos to finish construction and suggests that another child share, but the other child refuses. Observed child has a desirable dress-up material and female peer says, "I'll let you wear the red hat I have and you let me wear the belt." Observed child agrees.
Success in influencing peers: Successful attempts to influence, use organizing strategies, or use accommodating strategies with peers. Success is an outcome of a self-initiated social interaction where the goal is realized.	Child playing in the sand with female peer says, "Let's make a house" and the other child agrees. Male peer does not continue out the door when he hears observed child say, "We are not supposed to go there without the teacher."
Use of verbal means in social interaction: Use of verbal attempts (rather than gestures, demonstration, or physical force) to influence peer.	Child says to peer: "You can have the red ones; I'll take the black ones." Child at table with two female peers: "We have to clean up before juice."
Resists rules or teacher: Failure to direct oneself according to the physical or social constraints of the setting. Rules should be clear and explicit.	Teacher announces: "Time to start cleaning up now" and child continues coloring. Child runs to block area and teacher announces: "Remember, no running in school."

using the same videotape clips). Second, we present data on interobserver agreements during the first two weeks of the spring 1991 data collection episode. Each observer and a second observer independently recorded behaviors of the same child in a classroom setting. Finally, we discuss the inter-observation stability of Bronson observations.

Criterion-Related Agreement

In order to minimize data collector unreliability, we compared each observer's independent recording of behaviors using the same video clips of children with those of an independent expert (the instrument's developer) (Frick & Semmel, 1978). We used this criterion-related agreement measure both at the end of training to ensure that observers were adequately trained before actual data collection and near the end of the data collection episode to establish the degree to which observers maintained their accuracy.

We used the smaller/larger index (S/L) to establish criterion-related agreement (Suen & Ary, 1989). This index is calculated by dividing the smaller by the larger of two values of behavior occurrence reported by two independent observers observing the same event. Although the S/L index is commonly used by child development researchers and applied behavior analysts, it is challenged by others because (a) observers can disagree on many specific cases yet have similar or identical totals, and (b) a number of its mathematical properties are undesirable (Suen & Ary, 1989). Because Bronson data are typically analyzed by total frequencies or rates of individual categories of behavior, the S/L index was considered suitable because it is computed using these frequencies or rates.

By the end of one week of training, our 16 data collectors achieved an average criterion-related agreement of 90 percent or higher in each of the 24 Bronson categories (refer to Exhibit C.3). Individual data collectors did range, however, in their percent of agreement with the independent expert. Behavior categories in which criterion-related agreement fell below 80 percent include:

- Exploring materials (1 observer)
- Gathers, groups, structures materials/work (2 observers)
- Follows rule, sequences task, verbalizes rule (2 observers)
- Shares, trades, takes turns (2 observers)
- Social control (3 observers)

We did not consider these lower levels of agreement to be a problem because (1) only three of the data collectors fell below 75 percent in any category, and (2) no observer fell below 80 percent in more than two behavior categories.

Exhibit C.3
Interobserver Agreement Using Videotape Clips

	End of Training			End of Data Collection Period		
Bronson Category	Average Agreement %	Range	No. <90% ($N = 16$)[1]	Average Agreement %	Range	No. <90% ($N = 15$)[1]
Organized interaction, conversation	98	95-100%	0	99	94-100%	0
Other social interaction	100	--	0	100	--	0
Involved watching	98	88-100	3	100	--	0
Task with goal	98	88-100	1	98	94-100	0
Exploring materials	98	75-100	2	100	--	0
Other non-social	100	--	0	100	--	0
Uninvolved	100	--	0	100	--	0
Gathers, groups, structures materials	91	75-100	7	93	83-100	1
Follows rule, sequences task	91	68-100	5	96	92-100	0
Notices features	93	85-100	3	94	78-100	2
Consistently correct	97	83-100	2	98	95-100	0
Mixed	99	88-100	1	100	--	0
Mostly/all incorrect	100	--	0	100	--	0
Distracted	98	90-100	0	95	89-100	1
Asks help M/S	99	88-100	1	97	88-100	1
Helps M/S	99	88-100	1	100	--	0
Suggests play	95	86-100	3	89	75-98	5
Shares, trades	93	63-100	4	95	88-100	2
Social control	90	58-100	6	89	73-100	3
Hostility	100	--	0	100	--	0
Resists rules	100	--	0	100	--	0
Controlled by teacher	96	83-100	2	99	90-100	0
Successful task completed	99	90-100	0	100	--	0
No success	100	--	0	100	--	0

[1] Number of data collectors not reaching 90% agreement with precoded video clips

We were encouraged when reviewing criterion-related agreements near the end of the data collection episode that the 15 data collectors (one data collector left the project at the beginning of the data collection episode) again maintained an average of 90 percent or higher in all but two of the categories (which averaged 89 percent) and many more achieved at least a score of 85 percent. Behavior categories in which criterion-referenced reliability fell below 85 percent included:

- Gathers, groups, structures materials/work	(1 observer)
- Notices features, feedback efforts	(1 observer)
- Suggests play, assigns roles, states rules	(3 observers)
- Social control	(1 observer)

Interobserver Agreement

Even if observers demonstrate high agreement during a training situation, there is no guarantee that skills will not deteriorate subsequently under less ideal situations in classrooms. We elected to send two of the trainers across the country to assess interobserver agreement in field situations and to offer extra training and clarification as needed. Fifteen of the 16 data collectors were found extremely reliable, averaging 90 percent or higher in all but two of the behavior categories (which were in the high 80s) (refer to Exhibit C.4). The performance of one data collector had seriously deteriorated, and even after intense remedial assistance on site was judged inadequate. As a result, all of her data were discarded and her remaining classes were reassigned to other data collection staff.

Exhibit C.4
Field-Based Interobserver Agreement
(First Three Weeks of Data Collection)

Bronson Category	Average Agreement	Range	No. <90% (N = 15)[1]
Organized interaction, conversation	94	83-100%	5
Other social interaction	92	74-100	5
Involved watching	96	80-100	3
Task with goal	93	75-100	4
Exploring materials	96	80-100	3
Other non-social	96	86-100	2
Uninvolved	99	84-100	1
Gathers, groups, structures materials	97	86-100	2
Follows rule, sequences task	87	70-100	7
Notices features	92	78-100	5
Consistently correct	92	76-100	5
Mixed	97	83-100	1
Mostly/all incorrect	94	83-100	4
Distracted	99	89-100	1
Asks help M/S	95	65-100	3
Helps M/S	96	67-100	2
Suggests play	93	78-100	6
Shares, trades	97	82-100	1
Social control	86	65-100	9
Hostility	97	65-97	2
Resists rules	100	--	0
Controlled by teacher	93	55-100	3
Successful task completed	99	93-100	0
No success	100	--	0

[1] Number of data collectors not reaching agreement with a trainer

Stability

A third type of reliability assessment includes a study of inter-session stability, or the extent to which data from a given observation correlate with data from other observations. Recall that a Bronson observation occurs when a trained data collector records child behaviors over ideally six 10-minute observation periods. An observation period is classified as either a "mastery" or "social" observation depending on the type of behavior in which the child is engaged when the observation begins. Generally, the observer seeks to record three mastery and three social observations over a two-week period.

In the present study, however, data collectors were unable to conduct three mastery and three social observations for all children; 472 of the 621 children observed ended up with only two mastery and two social observations. Since only a portion of the sample was observed for the maximum time desired, we thought it would be informative to determine inter-session stability of the Bronson for children with fewer than three observations in either the mastery or social areas. We defined inter-session stability as the similarity in the frequency of certain types of behavior across observational sessions. Thus, calculating correlation coefficients for the frequency of certain behaviors across observational sessions should inform us of the stability and representativeness of the behavior in cases where two rather than three observations occurred.

Data from the 149 children who had three mastery and three social observations were analyzed. For each of the eleven variables used to answer our principal research questions, the average frequency of the first two observations was correlated with the frequency of the third observation. The degree of inter-session stability is given by the strength of that correlation. Correlations for mastery and social observations are given below.

Mastery Variables	Pearson *r*
Time in task with a goal	.30**
Time uninvolved	.00
Task organizing/planning strategies	.56**
Tasks completed successfully	.56**
Time distracted in mastery	.17
Social Variables	
Time in social interaction	.67**
Organizing strategies with peers	-.04
Accommodating strategies with peers	-.02
Success in influencing peers	.27**
Use of verbal means in social interaction	.40**
Resists teacher's rules	.49**

** $p \leq .001$

For mastery observations, the frequency of organizing/planning strategies and number of tasks completed successfully were relatively stable across observations. The time children spent in a task with a goal and the time children were distracted in mastery were somewhat less stable.

The mastery variable, amount of time children spent uninvolved, exhibited no stability from session to session. This is due in part to the fact that children spent little time uninvolved.

For social observations, two variables showed no stability across observational sessions: organizing and accommodating strategies with peers. Other social variables showed a moderate degree of stability across observations, with the time children spend in social interaction showing the greatest stability.

The stability data from the Chapter 1 substudy compares favorably with the stability data from the BEEP pilot study (Bronson, 1978). In the BEEP pilot study, stability was measured by one-way repeated measures analyses of variance for each category (Winar, 1962). The frequencies and distributions of behavior observed when observations begin in social interactions are quite different from those observed when observations are begun in mastery tasks, so the stability estimates were computed separately for the two sets of observations (as they were in our Chapter 1 substudy analysis). Correlations from the BEEP study are given below.

Mastery Variables

Time in task with a goal	.26
Time uninvolved	.69
Task organizing/planning strategies	.54
Tasks completed successfully	.58
Time distracted in mastery	.69

The time uninvolved and time distracted in mastery variables were more stable in the BEEP study but it should be noted that the BEEP sample and conditions of observation were quite different. The BEEP pilot study children were older (kindergarten) and had been selected by their teachers as being either very high or very low in general competence. Extreme groups would inflate stability estimates. In addition, all children were observed under "ideal" conditions—in freely chosen activities. Here the close agreement between the Chapter 1 substudy and BEEP pilot study stability estimates is impressive.

Our stability estimates for the social variables look even better when compared to the BEEP pilot study data shown below.

Social Variables

Time in social interaction	.07
Organizing strategies with peers and accommodating strategies with peers	-.06 (pooled in BEEP data)
Success in influencing peers	.47
Use of verbal means in social interaction	.10
Resists teacher's rules	.33

Children's behavior ought to be more stable when they have relative control over their activities. This is more the case when children work alone on tasks; in social interactions children's behaviors are partially determined by the actions of others. Given these assumptions and the BEEP data, the Chapter 1 stability is remarkable.

Another issue related to the stability of this instrument is that only the *total group* of behavior categories was ever expected to provide a reasonably reliable estimate of a child's skills. The total group of observations has shown both coherent relationships with other measures and predictive validity from kindergarten to second grade (Bronson, 1978, 1985). Given these considerations, the stability figures from the Chapter 1 substudy could be regarded as acceptable to good.

Interpretations of the Low Intercorrelations Among Bronson Variables

Analysis of the Bronson data found that few of the variables correlated with one another greater than $r = .25$ when the child was used as the unit of analysis. The weak intercorrelations among Bronson variables are not unexpected for several reasons. First, the behavior categories were selected for their differing contributions to measuring the mastery and social behaviors of children and any found to be redundant were eliminated. A coherent pattern of low but consistent relationships within and across domains was anticipated and establishes that the instrument was performing as expected (Bronson, 1985; Seppanen, Bronson, & Metzger, 1992).

We compared intercorrelations among variables that are common to both the Chapter 1 and the BEEP data at three different ages of the sample children (refer to Exhibits C.5-C.8). The mastery, social, and use of time variables in the BEEP sample intercorrelate in much the same way at three different ages, showing coherent competence clusters among the major variables. The pattern of relationships between cooperative play and the other social variables is relatively consistent, and social and mastery strategies continue to show a positive relationship. The relationship between tasks completed successfully and the other variables becomes stronger as children get older. The use of time clusters continue to suggest the same patterns across age groups. Time uninvolved continues to be negatively related to success in influencing others as well as being negatively related to time in social and mastery activities. Social involvement also has a consistently negative relationship with distraction in mastery, and mastery involvement continues to have a positive relationship to the percent of social involvement at cooperative and organized levels, suggesting a general social and mastery competence relationship. The degree of classroom structure and emphasis on mastery experiences and behaviors, with a corresponding de-emphasis on social experiences and behaviors, is evident in the relative strengths of the mastery and social clusters at second grade. Overall, the pattern of relationships between social and mastery variables remains somewhat consistent over time though the strength of the relationships varies.

The persistence of these patterns is especially impressive given the demographic differences between the Chapter 1 and BEEP samples, the differences in age (which could by itself produce very different patterns), differences in classroom conditions across the different ages, and the fact that most of the Chapter 1 children had sets of four rather than six observations. We see the persistence and coherent development of these patterns as evidence of construct validity (as well as interesting child development data). This theoretical coherence and relative stability over time, with explainable strengthening and weakening of the patterns with

Exhibit C.5
Intercorrelations Among Chapter 1 Substudy Bronson Variables
(*N* = 621)

Variable	1	2	3	4	5	6	7	8	9	10
Mastery										
1. % tasks completed successfully										
2. Rate task attack strategies	.11*									
3. % time distracted	-.25***	.14**								
Social										
4. % time cooperative play	.06	.04	.05							
5. Rate cooperative strategies	.04	.20**	.03	.23**						
6. % successful social control	.10*	.09	-.07	.16**	-.01					
7. % verbal social control	.03	-.05	.07	.24***	.01	-.02				
Use of Time										
8. % time in mastery activities	.20***	.06	-.05	.18***	.12*	.07	.15***			
9. % time in social activities	.10*	.02	-.16**	.20***	-.05	.08	.11*	-.14**		
10. % time not involved	-.03	-.13*	.07	-.11*	-.01	-.19***	-.12*	-.13**	-.25***	

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Key:

▭	Significant correlations among Chapter 1 substudy Bronson variables that have similar patterns of intercorrelation at one or more data collection points in the BEEP longitudinal study.

Exhibit C.6
Intercorrelations Among Selected Bronson Variables from the BEEP Longitudinal Study
Fall Kindergarten Observations
(N = 621)

Variable	1	2	3	4	5	6	7	8	9	10
Mastery										
1. % tasks completed successfully										
2. Rate task attack strategies	$\boxed{.27}$									
3. % time distracted	$\boxed{-.14}$	-.10								
Social										
4. % time cooperative play	.13	.14	-.10							
5. Rate cooperative strategies	.13	$\boxed{.11}$	-.11	$\boxed{.63}$						
6. % successful social control	.20	-.02	-.21	$\boxed{.32}$	.33					
7. % verbal social control	.12	.02	-.13	$\boxed{.23}$	.23	.42				
Use of Time										
8. % time in mastery activities	$\boxed{.07}$	-.13	-.02	$\boxed{.20}$	$\boxed{.20}$	.07	.01			
9. % time in social activities	$\boxed{.10}$	.04	$\boxed{-.23}$	$\boxed{.26}$	.18	.35	.28	$\boxed{-.15}$		
10. % time not involved	-.27	.04	.14	$\boxed{-.11}$	-.22	$\boxed{-.37}$	$\boxed{-.27}$	$\boxed{-.20}$	$\boxed{-.49}$	

Note: Significance levels not reported for intercorrelations in the summarized BEEP data.

Key:

☐ Bronson variables that showed significant intercorrelations in the Chapter 1 substudy.

Exhibit C.7
Intercorrelations Among Selected Bronson Variables from the BEEP Longitudinal Study
Spring Kindergarten Observations
(*N* = 358)

Variable	1	2	3	4	5	6	7	8	9	10
Mastery										
1. % tasks completed successfully										
2. Rate task attack strategies	$\boxed{.34}$									
3. % time distracted	$\boxed{-.06}$	-.05								
Social										
4. % time cooperative play	.14	.22	-.15							
5. Rate cooperative strategies	.17	$\boxed{.18}$	-.05	$\boxed{.54}$						
6. % successful social control	.18	.13	-.16	$\boxed{.22}$	.17					
7. % verbal social control	.09	.06	-.14	$\boxed{.04}$	.18	.30				
Use of Time										
8. % time in mastery activities	$\boxed{.21}$	.05	-.16	$\boxed{.22}$	$\boxed{.14}$	.14	.09			
9. % time in social activities	$\boxed{-.11}$	-.09	$\boxed{-.14}$	$\boxed{.15}$	-.10	.17	.20	$\boxed{-.19}$		
10. % time not involved	-.06	-.04	.10	$\boxed{-.06}$	-.14	$\boxed{-.30}$	$\boxed{-.29}$	$\boxed{-.15}$	$\boxed{-.36}$	

Note: Significance levels not reported for intercorrelations in the summarized BEEP data.

Key:

☐	Bronson variables that showed significant intercorrelations in the Chapter 1 substudy.

Exhibit C.8
Intercorrelations Among Selected Bronson Variables from the BEEP Longitudinal Study
Spring Second-Grade Observations
(N = 408)

Variable	1	2	3	4	5	6	7	8	9	10
Mastery										
1. % tasks completed successfully										
2. Rate task attack strategies	.54									
3. % time distracted	-.49	-.36								
Social										
4. % time cooperative play	.19	.13	-.12							
5. Rate cooperative strategies	.16	.13	-.10	.31						
6. % successful social control	.27	.19	-.22	.29	.05					
7. % verbal social control	.16	.06	-.18	.19	-.01	.22				
Use of Time										
8. % time in mastery activities	.16	-.04	-.18	.08	.17	-.03	.08			
9. % time in social activities	.04	.02	-.06	.18	.20	.19	.19	-.22		
10. % time not involved	-.22	.14	.12	-.23	-.21	-.34	-.10	-.27	-.27	

Note: Significance levels not reported for intercorrelations in the summarized BEEP data.

Key:

☐ Bronson variables that showed significant intercorrelations in the Chapter 1 substudy.

increasing age and type of (probable) classroom experiences, suggests that the Bronson observations provide a reasonably reliable sample of the major target variables and have validity as an outcome measure beyond (though influenced by) particular classroom contexts and in spite of classroom differences.

A second explanation for low intercorrelations among Bronson variables is that behavioral data collected in the natural environment do not necessarily produce the kinds of correlations that constructed "tests" administered under standardized conditions do.

A third explanation for low intercorrelations among Bronson variables is that our observations likely were influenced by classroom contexts and did not just measure individual differences in child competence. Unlike child responses on the PSI, in which the stimulus situation is standardized, the stimulus situations in which Bronson outcomes are generated include different and unique classroom environments. The types of materials available for social and mastery activities in a classroom, the relative amounts of time available to the child for use of materials, the size and demographic composition of the peer group available for interaction, and the number and behavior of the adults in the setting all have some impact on a child's behaviors. The observed behaviors reflect some mix of individual child differences and attributes of the social and material setting. The effects of classroom differences are magnified when children cannot be observed in the "free choice" conditions optimal for this instrument since it focuses on independent goal oriented activities. When children's goals and strategies must be filtered through constraints of "required" and/or externally directed activities, relatively more of the variance in Bronson behavior variables will be environmentally generated. Individual differences among children will appear only as the classroom context allows them to be revealed. One might say that this interpretation to some degree characterizes the Bronson variables as contextually driven opportunities for action.[1] To the extent that the Bronson variables reflect differences in classroom contexts, they can be used for indirect assessment of the classroom environment. The Early Intervention Collaborative Study used the Bronson this way in part and found significant differences in the behaviors of special needs preschoolers in relation to degree of integration (mainstreaming) in the classroom regardless of mental age or disability (Shonkoff et al., 1992).

Evidence for environmental influences on the Bronson data in the Chapter 1 study is available from three sources. First, significant difficulties in meeting "free choice" (optimal) conditions for observations were reported by the data collectors in the field. Second, an examination of distributions of Bronson variables across classrooms revealed an unusually large variation in classroom means of child behavior. (If we assume that children in the various classrooms were drawn from a common population of four year old children who were eligible for services under Chapter 1, then we can hypothesize that this variation is due to classroom conditions and not to individual child differences.) Finally, meta-analysis of correlation coefficients of CBRS and Bronson aggregated to the classroom-level, turned up median correlations ranging from $r = .35$ to $r = .43$, depending on the Bronson variables examined.[2] (These data suggest that, to some extent, both the CBRS and the Bronson capture classroom-level effects through child behaviors via two modalities of measurement.)

Development of Meaningful Bronson Variables

Data from the Bronson instrument has been used in a variety of ways to measure outcomes in past studies. The most typical approach has been to report data at the behavioral level in order to preserve the richness inherent in behavioral observations. The individual variables have been arranged in "profiles" of behaviors in two major areas—"mastery" (behavior in tasks with goals) and "social" (behavior with peers). In these profiles, variables have been reported as scores: (1) rates per minute of target behaviors, (2) proportions of time spent in target activities, or (3) proportions of successful outcomes or use of certain styles of interaction over all attempts. The sample of behaviors most frequently used as outcomes appears in Exhibits C5-C8 in this appendix. Profiles of behaviors have been used to measure outcomes in the Brookline Early Education Project (BEEP) study (Bronson, Pierson, & Tivnan, 1984; Hauser-Cram et al., 1991; Pierson et al., 1983) and in the Early Intervention Collaborative Study (EICS) (Shonkoff et al., 1992). Profiles have been related to *specific classroom conditions* (Shonkoff et al., 1992), *demographic variables* (Hauser-Cram et al., 1991; Shonkoff et al., 1992), *intervention conditions* (Bronson, Pierson, & Tivnan, 1984), and *behavior scores of comparison groups* (Bronson, Pierson, & Tivnan, 1984; Pierson et al., 1983; Shonkoff et al., 1992).

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[1] This notion does not necessarily reflect poorly on the Bronson. If, for example, we argue that a certain classroom attribute stimulates certain types of educationally beneficial behavior (such as strategy use, task success, and task completion), then the Bronson might be used to measure that classroom attribute (reflected in the actual behavior of children).

[2] This technique suffers from possible instability of the analyzed coefficients due to the small sample sizes of the classrooms. When sample sizes are small, outlying values can inflate the strength of coefficients. We avoided this problem by using the median.

Another method for evaluating outcomes using profiles has been to establish "cut-off" scores (at one standard deviation below the group mean) to indicate low performance on each behavior variable in the two profile areas. For example, in the BEEP study two or more scores below the cutoff in one of the areas was considered to indicate that a child had a "problem" in that area (Bronson, Pierson, & Tivnan, 1984; Pierson et al., 1983). Since a major goal of the BEEP study was the successful reduction of problems in relation to a comparison sample of children, these cutoff scores demonstrated a successful outcome for the intervention group.

In past studies, raw behavior frequencies were converted to rate or proportion scores to stand for time spent in an activity. For instance, the number of task strategies observed was divided by the amount of observation time spent in tasks to reflect level of skills per unit of time spent in this activity. Hence, two strategies in a two-minute task reflected a higher level of skill than two strategies in a ten minute task. This "correction" for time works well as an indicator of competence in independent goal-oriented activities when the child is free to engage in activities spontaneously, to choose a level of difficulty and effort, and to persist as long as interest dictates. However, when these choices are controlled from outside (i.e., by classroom constraints), the rate scores may not so clearly reflect the child's own efforts and abilities.

Predictive Validity of Prekindergarten Measures

The Bronson variables measure individual child differences mediated by the classroom environment. To the extent that the environment is highly constraining, or does not provide the types of materials and opportunities that allow children to reveal independent social and mastery skills, individual child differences will be masked. When the environment does not provide either the opportunity or the materials (which support independent mastery tasks or socio-dramatic play) for the child to demonstrate independent skills, the behavior variables may reveal relatively more about variations among environments and relatively less about variations among children.

Our preliminary analyses focused on the relationships among child-level variables and between child-level and selected classroom-level variables.[3] One analysis showed that children's behavioral competence (measured by the composite Bronson variable that included social and mastery strategies and success in carrying out tasks) was positively related to age, risk-level, and cognitive achievement as measured by the PSI, implying that classrooms that encourage or provide opportunities for goal oriented social and mastery strategies and successes facilitate cognitive achievement in children. Other analyses showed that Bronson variables and the PSI were more related to the CBRS within classrooms than across classrooms. Teacher ratings are probably more reliable within than across classrooms because teachers use their own experience and perhaps their current group of children as a baseline for these judgments. Since teachers' experiences and classroom groups can vary widely, using CBRS data across classrooms may be problematic.

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[3] Refer to the *Volume III: Technical Appendices*.

ACKNOWLEDGMENTS

The authors of this report wish to acknowledge the help and support of a number of individuals. Special thanks go to our project officers at the U.S. Department of Education's Office of Policy and Planning, first to Elizabeth Farquhar, who conceived the study and provided detailed criticism and constant support, and secondly to Elois Scott, who shepherded the study through its final stages. We are grateful to the study's advisors Douglas Besharov, Sue Bredekamp, Verne Duncan, Carolyn Jarvis, Lynn Kagan, Michael Lamb, Lius Laosa, Deborah Phillips, and Henry Riccuiti.

Of course, the study could not have been accomplished without the cooperation of the personnel in the 16 school districts, 55 Chapter 1-funded prekindergarten classrooms, and 48 kindergarten classrooms, who agreed to participate. By site, they include:

California
Richmond Unified School District
San Francisco Unified School District

Florida
Broward County Public Schools
Dade County Public Schools

Texas
East Central ISD
Edgewood ISD
Northside ISD

Michigan
Ann Arbor School District
Crestwood School District
Ecorse School District
Highland Park School District
Southfield School District

New Jersey
Linden School District
Newark School District
Rahway School District
Scotch Plains-Fanwood School District

We thank Don Cichon, Paula Rhodes, and Maryana H. Huston of Development Assistance Corporation for their support, most especially for the organization and supervision of a complex data collection effort. Six field coordinators, Beckie Anderson, Jacqueline Dannis, Linda Davidson, Linda Vigil, Lydia Rodriguez, and her replacement during the kindergarten year data collection, Phyllis Terry, committed themselves wholeheartedly to the study and its objectives. We thank them and the child assessors at each site for their enthusiasm and dedication.

We are grateful to Jean Layzer, Barbara Goodson, Marc Moss, and Geraldine Berghauer from Abt Associates for their help and advice. We thank Everett Barnes, Cliff Cox, Chris Dwyer, Colleen Orsburn, Allen Schenck, and Karen Schuster from RMC Research for their support and for reviewing earlier drafts of this report. In addition, we would like to acknowledge other staff members at RMC Research who played key roles in training child assessors, data entry, and report preparation: Faith Ballance, Judy Ballester, Judy Cercone, Betty Daly, Rob Dumais, Susan Dumais, Evelyn Jenks, Kara King, Dawn Miller, and Angela Whiting.

A special word of appreciation goes to our former colleague, John Love, who served as the Chapter 1 substudy director through the first two years of data collection and continued as a consultant in the analysis of the continuity/discontinuity of experience from prekindergarten to kindergarten.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1994 - 363-410 : QL 3